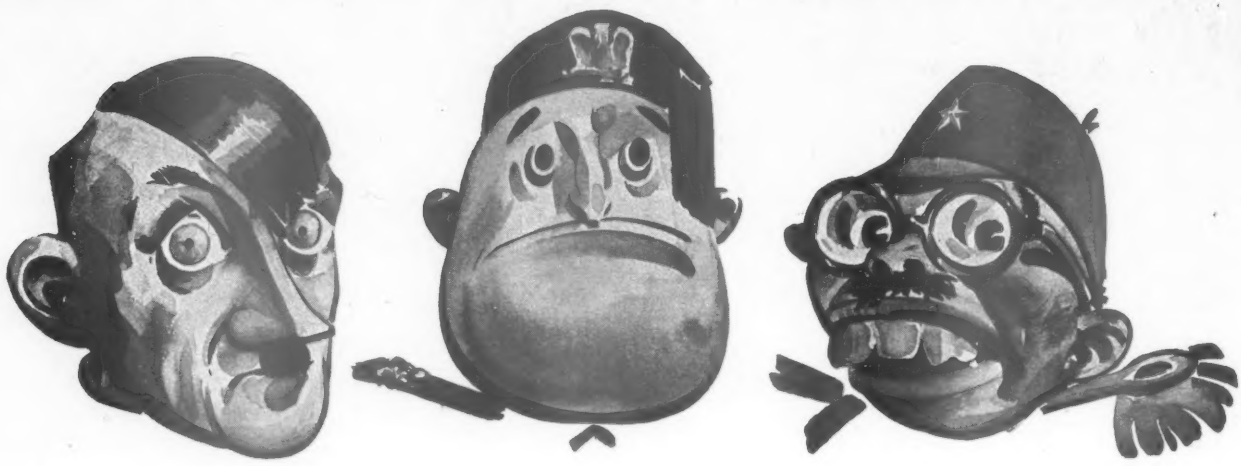
JAN 29 1943

The OIL AND GAS JOURNAL

Keep 'er
IN FIGHTING
CONDITION!
Yes, sir, the operator who keeps his Wilson Power Rig properly lubricated, operates it in a careful and common-sense manner, keeps it properly adjusted at all times, gives it regular check-ups and makes necessary repairs when needed, is prolonging the life of his rig and assuring himself of continuous satisfactory service. Much of the manpower, skill and material formerly used for our rigs is now going into equipment for Victory. So help your country by making your Wilson Rig last longer! But a limited number of high quality Wilson Rigs and Winches are still available. Write or wire us for your requirements.
Wilson POWER RIG
Wilson
ANUFACTURING COMPANY, INC.
WICHITA FALLS • TEXAS
PORT REPRESENTATIVE • GUY E. DANIELS • 30 ROCKEFELLER PLAZA • NEW YORK CITY
CIFIC COAST DISTRIBUTOR • H. & B. SALES CO., LTD. • LONG BEACH • CALIFORNIA

ANNUAL JANUARY 28, 1943 NUMBER



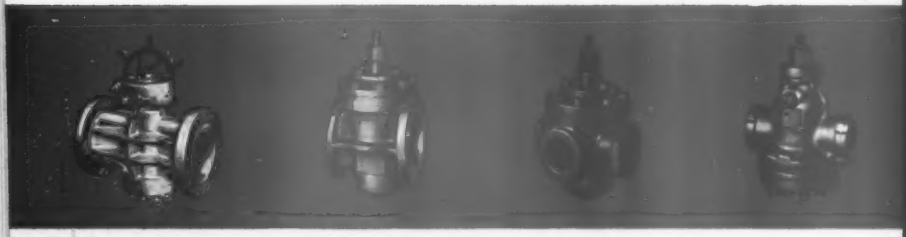
HELL FOR HITLER, ET AL

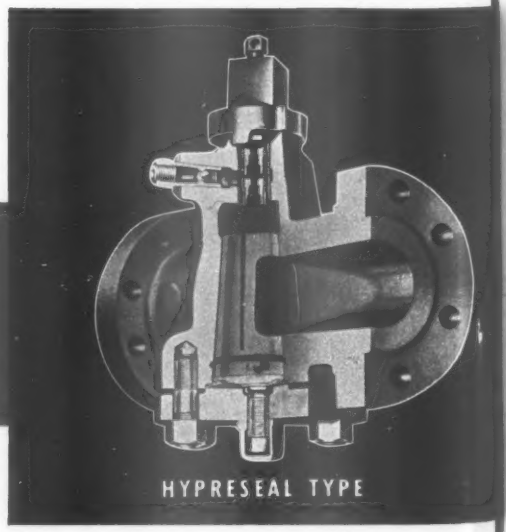
THROUGH NORDSTROM VALVES

Long before Pearl Harbor, Nordstrom Lubricated Valves entered war service. Nordstroms were developed for services now considered the most critical and most essential for war needs—particularly in the production of synthetic rubber from derivatives of oil, gas, etc.; also the production of magnesium and vital war chemicals. While Nordstrom Valves are making flow control a certainty in the scores of recently built chemical war plants, tens of thousands of other Nordstroms are saving incalculable man-hours in the oil, gas and chemical industries by their freedom from corrosion, freedom from sticking and freedom from leakage. They're pressure-lubricated. It takes less time to open or close a Nordstrom. Least space is occupied because Nordstroms are compactly designed without overhanging yokes. Highest pressures and extreme temperatures are successfully handled. *Ask for Bulletins.*

The most Vital Valves for Victory

-NORDSTROMS KEEP UPKEEP DOWN





HYPRESEAL TYPE

MERCO NORDSTROM VALVE CO. • *A Subsidiary of Pittsburgh Equitable Meter Co.*

Main Office: Pittsburgh, Pennsylvania • *Branches:* Boston · Buffalo · Brooklyn · Chicago · Columbia, S. C. · Des Moines · Houston · Kansas City · Los Angeles · Memphis · New York City · Oakland · Philadelphia · San Francisco · Seattle · Tulsa

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE ST., TULSA, OKLAHOMA

JANUARY 28, 1943

VOLUME 41, NUMBER 38

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — H. STANLEY NORMAN, *News Editor*

R. C. MAC DOUGALL, *Circulation Manager* — ARCH L. FOSTER, *Refinery Editor*

W. L. NELSON, *Technical Editor* — W. V. HOWARD, Ph.D., *Field Editor*

HARRY F. SIMONS
Production Engineering Editor

Associate Editors

LYNN M. NICHOLS — PAUL REED
NEIL WILLIAMS

District Editors

THOMAS F. SMILEY, Houston, *617 Caroline St.* — CARL HOOT, Tulsa, *211 S. Cheyenne Ave.*

L. P. STOCKMAN, Los Angeles, *Union Oil Bldg.* — HARRY F. SIMONS, Fort Worth, *Petroleum Bldg.*

HENRY D. RALPH, Washington, *Natl. Press Bldg.* — J. P. O'DONNELL, New York, *415 Lexington Ave.*

O. C. PRESSPRICH, Saginaw, *News Bldg.* — TOLBERT R. INGRAM, Denver, *State Office Bldg.*

VICTOR LAURISTON, Chatham, Ont., *35 Stanley Ave.* — A. C. MacINTYRE, Oil City, *Derrick Bldg.*

Advertising

E. KLAPPENBACH, *Vice President*

KENNETH J. LANGLEY, New York, *415 Lexington Ave.* — HOWARD MARKT, Cleveland, *Leader Bldg.*

C. R. FARMER, Chicago, *105 W. Madison* — MITCHELL TUCKER, Tulsa, *211 S. Cheyenne Ave.*

WAYNE RIVES, Houston, *617 Caroline St.* — J. HOWARD TINKHAM, Los Angeles, *1406 S. Grand Ave.*

A. J. CHAMBERS
Twickenham (Middlesex) England—*72 Cole Park Road*

Member
Audit Bureau of Circulations
Associated Business Papers

Subscription price, United States and foreign, 1 year, $6.00; 2 years, $10.00; 3 years, $12.00; 5 years, $15.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1943, by The Petroleum Publishing Co.

Table of Contents

NEWS DEVELOPMENTS

All Oil Supplies May Be Regimented Under PAW ... 52
Frozen Fuel-Oil Prices Thawed to Encourage More Blending ... 52
Report on Production Shows Wide Disparity Among Fields ... 54
Special Material Directives Withheld on Rubber Plants ... 55
Fuel Requirements Force Blending of Light Oils ... 56
Camera Highlights ... 57
Federal Order Digest ... 58
Producers Declare 50-Cent Crude Rise Is Necessary ... 60

Trends ... 51
This Week ... 53
State Capitals ... 58
Editorial ... 62
Deaths ... 66
Refining News ... 197
Natural-Gasoline, Natural-Gas News ... 199
Pipe-Line News ... 200

ANNUAL REVIEW

Industry Entitled to Preferred Position ... 61
Proven Reserves 20,675,899,000 Barrels ... 64
Wartime Regulations Sharply Reduce Drilling Operations During 1942 ... 72
Production Stays at Peak Level ... 74
Oil Demand at New Peak ... 76
War Demand Assures Steady Refinery Operations ... 78
How Pipe Lines Supply East Coast ... 83
Tanker Program Dwarfs All Previous Building Efforts ... 84
Barge Shipments on Inland Waterways to Be Expanded ... 88
Quarter of Gas Output Goes to War Industries ... 92
World Production Slumps But Revival This Year Is Indicated ... 94
Ceilings Hold Most Petroleum Prices Static Despite Pleas for Relief ... 101
Averages on Oil Securities Reflect Anticipated Demand ... 103
Condensed Oil-Agency Directory ... 104
Chronology of Important Federal Oil Regulations ... 106
The Nation's Major Fields ... 171

Permian Basin, Panhandle ... 113
California ... 118
Oklahoma ... 125
Illinois ... 131
North Central Texas ... 137
Texas Gulf Coast ... 142
Kansas, Nebraska ... 147
Southwest Texas ... 149
Michigan ... 156
Eastern Texas ... 158
Louisiana Gulf Coast ... 161
North Louisiana, Arkansas ... 164
Rocky Mountain Area ... 167
Canada ... 168
Indiana ... 169
Ohio ... 170

ENGINEERING—OPERATING

East Texas' Future Directly Related to Return of Water to Woodbine Sand ... 175
Completion Practices in Northwest Wilmington Area, California ... 179
Thermal Efficiency in Topping Plants ... 180
Improved Penn State Smokemeter ... 182
Progress in Metals ... 185

Pipe-Line Suggestions ... 186
Operating Ideas ... 189
Cost Engineering ... 193
Engineering Fundamentals ... 195

EXPLORATION AND DRILLING

Week's Highlights ... 203
Reports by Areas Start on Page ... 204
December Completions Show Gain Over Previous Month ... 205

ADDITIONAL FEATURES

Crude Prices ... 222
Drilling Contractors ... 226
Personals ... 229
Market Developments ... 232
Tank-Wagon Prices ... 233
Refinery Prices ... 233
Equipment Progress ... 234
Classified Advertising ... 237
Advertisers' Index ... 240
Calendar of Events ... 240

General Heading: BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE

Unit No. A-20

Subject: Safe Landing and Efficient Cementing of Casing Strings

BAKER OIL TOOLS, INC.

Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.
Central Division Office and Factory:
6023 Navigation Blvd., Box 3048, Houston, Texas
Export Sales Office:
19 Rector Street, New York, N. Y.

Index: 250.1
Date: January 28, 1943
Page: Page 1

The safe landing and proper cementing of casing strings has always been one of the most important steps in oil well drilling operations. Under today's emergency conditions, with steel and other critical materials at a premium, this phase of the work assumes even greater importance.

Baker's contribution to this problem is *continuing* to make available a variety of Baker Shoes and Collars that will best assure the safe and successful landing, *and then cementing*, of your casing.

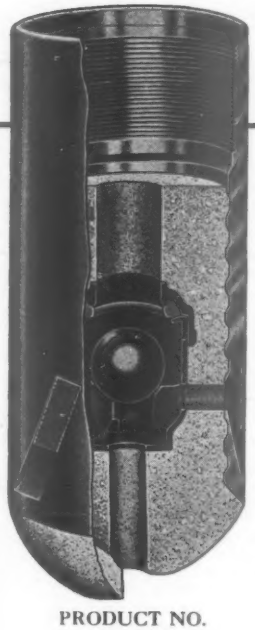
Whether your problem is one of landing and cementing a long, heavy string; or of cementing a short string in shallow depths; there is a particular type of Baker Cement Guiding, Floating, Cementing Equipment unit designed to do the job safely, efficiently and economically. Furthermore, when the casing is landed and properly cemented, Baker Shoes and Collars can be quickly and easily drilled out. Only easy drillable materials are ever used for the internal construction of these Baker Cement Equipment units.

Convenient Stocks: For convenience of operators, when time today often means more than money, adequate stocks of the more popular sizes of Baker Cement Guiding, Floating, Cementing Equipment units are maintained at strategically located points in all fields throughout the United States.

BAKER CEMENT GUIDING, FLOATING, CEMENTING EQUIPMENT

For sales, service or information concerning Baker equipment, contact the nearest Baker office or field representative.

BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE



PRODUCT NO. 120

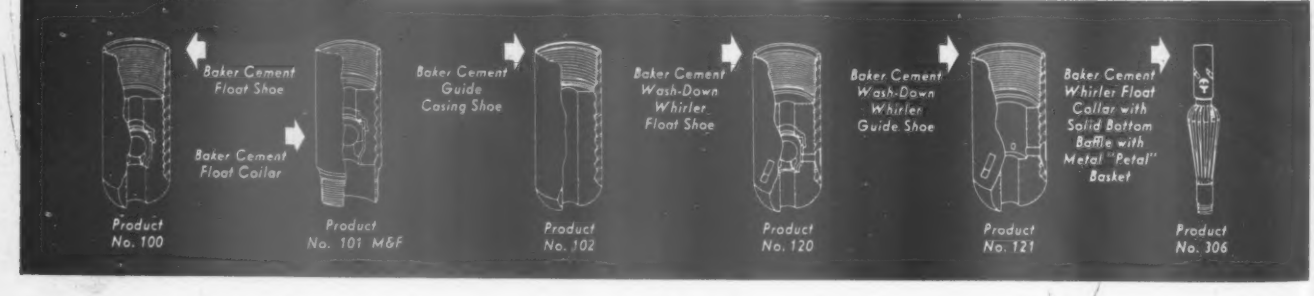
Affords These Advantages—

- ★ It will safely guide and float the longest and heaviest string of casing.
- ★ It has a positive acting *Ball-Type* Back Pressure Valve.
- ★ It provides Whirler Action which assures best possible cement distribution around the shoe with minimum hazard of channeling.
- ★ It affords easy drillability.

GET THE FACTS!

If you are not fully acquainted with Baker Wash-Down Whirler Equipment and the remarkable results operators are securing with it . . . . get the facts today!

Detailed information will also be found on pages 227 to 236 of the 1942 Baker, or Composite, Catalog.


Baker Cement Float Shoe
Baker Cement Float Collar
Product No. 100
Product No. 101 M&F
Baker Cement Guide Casing Shoe
Product No. 102
Baker Cement Wash-Down Whirler Float Shoe
Product No. 120
Baker Cement Wash-Down Whirler Guide Shoe
Product No. 121
Baker Cement Whirler Float Collar with Solid Bottom Baffle with Metal "Petal" Basket
Product No. 306

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production
By States—Page 204

CRUDE PRODUCTION 3,849,325 bbl. daily average—down 30,675 bbl. One year ago 4,321,455 bbl.

CRUDE STOCKS 232,647,000 bbl. as of Jan. 16—up 456,000 bbl. One year ago 246,267,000 bbl.

GASOLINE STOCKS 87,102,000 bbl. as of Jan. 23—up 2,147,000 bbl. One year ago 99,345,000 bbl.

RESIDUAL FUEL-OIL STOCKS* 71,216,000 bbl. as of Jan. 23—down 301,000 bbl. One year ago 90,764,000.

GAS OIL AND DISTILLATES 38,034,000 bbl. as of Jan. 23—down 1,807,000 bbl. One year ago 42,307,000.

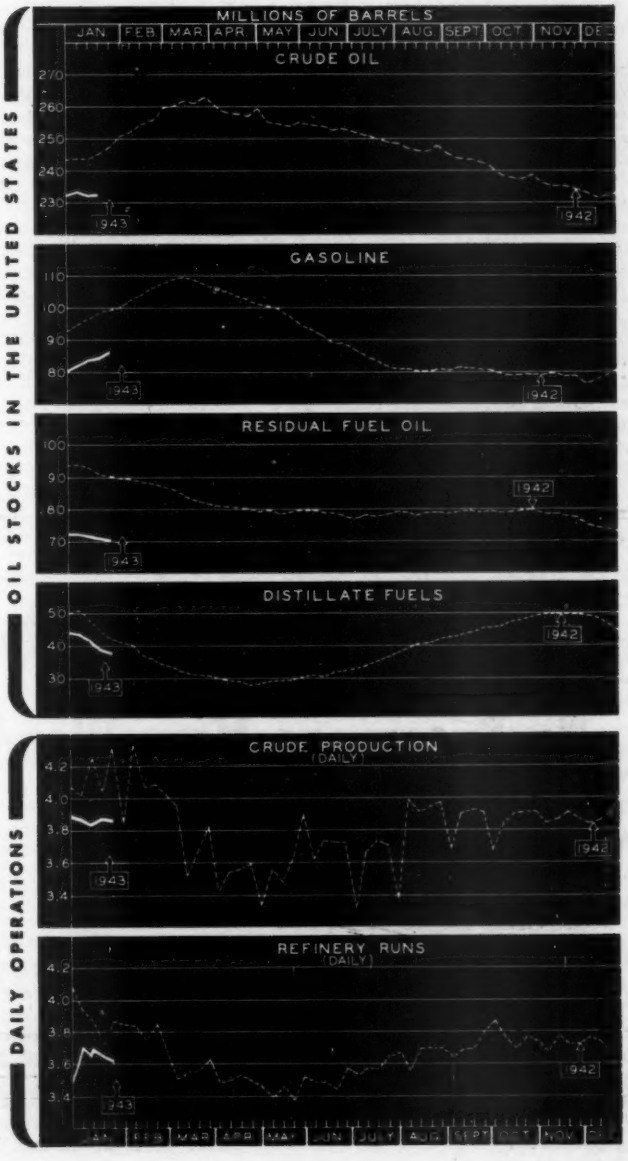
REFINERY RUNS—3,615,000 bbl. daily week ended Jan. 23—down 25,000 bbl. One year ago 3,874,000.

*Last week revised to 71,517,000 bbl.

IT is certain that the long-awaited report of the U. S. Tariff Commission to the Office of Price Administration, released this week, covering the cost of producing oil will be a live subject of discussion over the coming month. The commission had made investigations of the industry's crude-oil costs starting several years ago at the request of legislative investigators. The present investigation was asked early in 1942 by OPA in response to demands from the petroleum industry that posted schedules be advanced. It was pointed out at that time that there had been no general advance in crude-oil prices since May 1941, with costs of operations substantially higher under war conditions. The necessity of giving producers greater revenue from their existing operations in order that they would be justified in making whatever expenditures were necessary to find new oil was emphasized.

A SUMMARY of the 250-page report of the Tariff Commission reflects the difficulties in arriving at cost figures which are representative of conditions and which could be used as a fair basis in determining what future prices should be. The report stresses the wide variations in costs by fields and the conclusions will apparently support those who have advocated selective adjustments in prices. Within the industry it is felt by many that such a plan assumes a government subsidy arrangement in which refiners would be compensated for any inequalities that arose owing to the application of such a program. The plan has been strongly opposed by important groups among producers and refiners.

THE report also supports the statements of those who have pointed out that in certain areas costs of producing oil have been brought down by increasing allowables. In some cases it has been contended that the rate of recovery exceeded good operating practice although production costs per barrel for the period under investigation, were reduced. The report does not include exploration and development costs, of particular importance at this time because of the need to expand all types of this work. It is understood that representatives of the industry are prepared to challenge OPA officials should they take the position that this investigation shows that general higher prices for crude oil are not justified at this time. It is also reported that OPA will shortly hold hearings at which representatives of the industry will be permitted to present new information.



All Oil Supplies May Be Regimented Under PAW

UPWARD adjustment of fuel-oil prices in southwestern refining states this week was tempered with reports widely circulated in the industry that an order has been written, but so far unissued, which would regiment all phases of operation.

The proposed order which has been discussed in several executive meetings of oil-trade associations and within various district committees would require complete disclosure of the source and ultimate consumer of every petroleum product. The regulation under discussion would knit together all directives and orders of the Petroleum Administration for War and other federal agencies dealing with supply, including transportation, crude-oil production, manufacturing operations and consumption.

The directive, in its original and complete form, would instruct producers and manufacturers where, to whom and when all products should be delivered. For example, a war plant unable to utilize its full manufacturing capacity because of insufficient supplies of butane would explain conditions to a central-federal agency, presumably the PAW. If investigation confirmed the claim of butane shortage, suppliers shipping to less essential consumers would be instructed to divert sufficient material to the shorted war plant and discontinue services to the strictly civilian outlet. Most elements in the industry are objecting strenuously to aspects of the proposed order which would remove all decisions on distribution from the petroleum industry and transfer this authority to Washington, D. C. Objections are based on the argument that companies within the industry already are shifting supplies to meet the same objectives sought by the proposed order. Civilian and nonessential consumers are being shorted on numerous products in order that the primary supplier may satisfy needs of others more intimately related to the war-production program.

There is no positive assurance that the regimentation order will be issued although the fact that such an instrument has been prepared is evidence that federal agencies are thinking along this line. Chief opponents declare that only those intimately familiar with distribution and with requirements of the various consumers, meaning the men who now direct operations of the individual companies, are qualified from experience and training to do the most effective job with the least congestion in transportation and maladjustment of supplies. Fear is widespread that if control is centered in one agency, arbitrary decisions will be based on incomplete data and without benefit of familiarity with requirements of the individual consumers.

Frozen Fuel-Oil Prices Thawed To Encourage More Blending

WASHINGTON, D. C. — Premium prices for higher gravity fuel oils produced in the southwestern refining district were authorized January 25 by the Office of Price Administration in a move to encourage blending of distillates with residuals to increase the over-all supply.

Furthermore, the revised fuel-oil price ceilings will give economic support to recommendations of the Petroleum Administration for War for a decrease in the production of gasoline while raising the output of burning products.

	New maximum price schedule		
Gravity—	Area A	Area B	Area C
9.9 and below	$0.85	$0.80	$0.74
10.0-12.9	.90	.85	.85
13.0-16.9	1.02	.97	.97
17.0-20.9	1.14	1.09	1.09
21.0-24.9	1.26	1.21	1.21
25.0 and above	1.32	1.27	1.27

Area A includes all of Kansas, except refineries located within 25 miles of Kansas City, Mo.; Area B includes Oklahoma, Arkansas, Louisiana, exclusive of Gulf Coast and Mississippi River ports up to and including Baton Rouge, La., and Texas, exclusive of Gulf Coast, and the Panhandle north of the southern boundaries of Palmer, Castro, Swisher, Brisco, Hall, and Childress counties; Area C includes New Mexico and the Texas Panhandle north of the southern boundaries of Area B.

The price differential between northern and southern portions of the southwestern refining districts, the OPA said, would be largely equalized by transportation costs.

OPA action was based on recommendation of the PAW in an effort to make more industrial fuel oil available by creating an incentive for the blending of lighter burning products with low-gravity residuals. Adoption of a gravity price schedule also follows a recommendation made at the January meeting of the Petroleum Industry War Council.

The increase, according to OPA calculations, represents advances of 5 to 8 per cent. Normally, most of the industrial fuel (No. 6) ranged from 10 to 14 gravity, although numerous refiners have blended small amounts of lighter oils in order to obtain necessary volume of residual fuels since the start of the war.

Refiners File Appeals on Tank-Car Ban Order

Radical readjustments in shipping schedules coupled with immediate appeals for exceptions were the immediate reactions to last week's order from the petroleum administrator for war abolishing tank-car delivery of gasoline to the East Coast.

Applications for exception to the order were filed promptly by most refiners and they were particularly insistent from those manufacturing war products. Appellants declared that their operations would be seriously impaired if the prohibitive order is enforced on a rigid basis.

Most refiners, including those on the Gulf Coast and at inland points east of the Rocky Mountains, have shipped various quantities of gasoline by tank car to the East Coast since the supply shortage developed. Continuance of efficient and economical operation, most manufacturers declared this week, is dependent on their ability to ship part of their motor-fuel production by rail to East Coast consumers.

Object of the order (Petroleum Administrative Order 5, effective January 21) is to make more tank cars available for the delivery of fuel oil from the Midwest and Southwest to the East Coast shortage area.

The order does not affect the shipment of gasoline to the East Coast by pipe line, barge, truck, or other means.

Tank cars now en route to the 17 East Coast states and the District of Columbia with motor fuel may complete deliveries.

THIS WEEK

MARKETS—Five to eight per cent advance authorized on f.o.b. refinery fuel-oil prices. . . . ¶Adjustment places premium prices on higher gravity products, inviting refiners to blend light fuels with residuals—to increase supply of industrial fuels. . . . ¶Producers renew appeals for minimum 50-cent advance on crude prices, before Clark committee, at Kansas City, Mo., and Oklahoma City, Okla. . . . ¶Gasoline prices steady, pending disclosure of exception policy on banning East Coast tank-car deliveries. . . . ¶Sellers juggling supplies to fit directives, where optional shipping routes permit. . . .

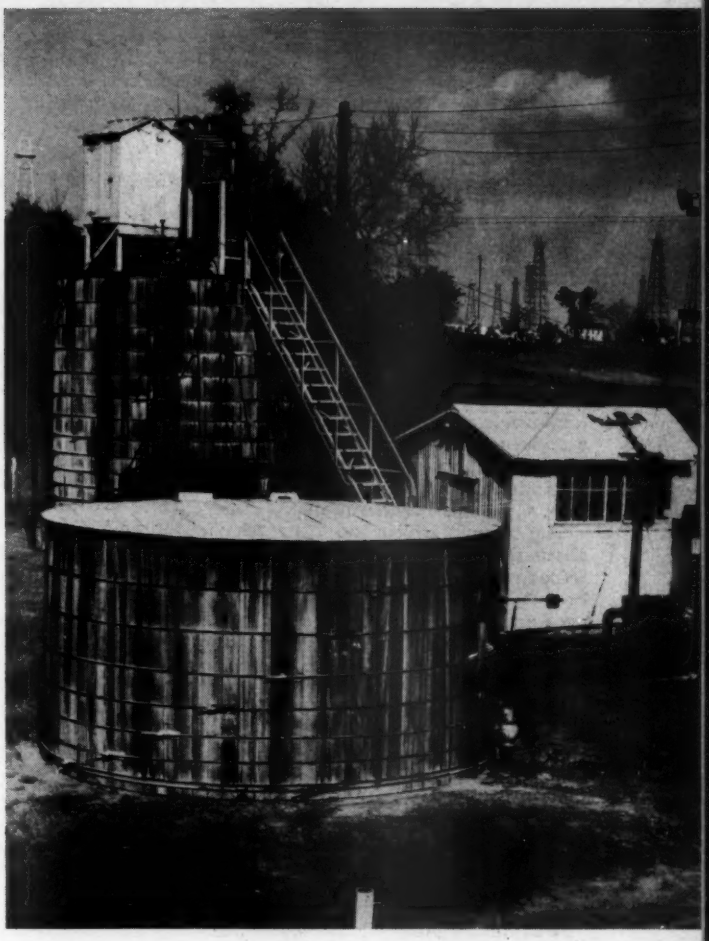
REFINING—Economic inducements, in form of fuel-price adjustment, helps outlook. . . . ¶Plant operators fear lower ceilings on gasoline may be next, BUT hopeful OPA policy change, under new administrator, will permit escape. . . . ¶Government witnesses testify synthetic-rubber plants can be completed by end of this year . . . ¶Some delays admitted, but not inordinate, considering scope of program. . . . ¶Competition for critical metals only uncertainty. . . .

RUBBER—Rumors repeated, more frequently, that production facilities will be delayed, postponed in favor of patrol boats, 100-octane plants. . . . ¶Director Jeffers fighting prospects. . . . ¶Final decision rests with Economic Stabilizer Byrnes. . . . ¶He must decide whether Army gets its way, whether rubber gets green light. . . . ¶Question hits at civilian productive capacity. . . . ¶Delays mean more transportation trouble, possible diminishment of production rates, all along war-material front. . . .

PRIORITIES—Manufacturers warned that bills of materials must be filed by February 9, to qualify for second quarter allotments, under CMP. . . . ¶Equipment export order, P-98-d, revoked, new procedure outlined. . . .

RATIONING—Fuel-oil rationing order in Pacific Northwest, aimed at cutting consumption 25 per cent. . . . ¶Possibility of national rationing of fuel voiced by Assistant Deputy DeGolyer, speaking for Administrator Ickes. . . . ¶OPA ban on nonessential driving for easterners relaxed, to permit attendance at meetings important to jobs, church, baptisms—IF other transportation isn't available. . . .

TRANSPORTATION—Tank-car deliveries of gasoline to East Coast, from outside suppliers, prohibited by petroleum administrator. . . . ¶Diversion of cars used for gasoline to fuel-oil service, aim of PAW. . . . ¶Inevitable output by eastern war-product refineries, considered adequate for essential driving. . . . ¶WPB decides to allocate 164,000 tons of steel for 20-in. products line, from Beaumont-Houston area to Seymour, Ind. . . . ¶Products deliveries of 110,000 bbl. per day anticipated by construction. . . . ¶WEP will handle building and operation of new system. . .



Reinjection of salt water to the Woodbine sand in East Texas is one of the most widely discussed topics of recent years in Texas. Field-wide adoption of the practice, engineers estimate, would increase the ultimate oil recovery by 600 million barrels. This disposal plant, symbolic of work which has been under way for months, was built months ago by Shell Oil Co., Inc. Water reaches the plant through gathering lines, is chemically treated, and then discharged to the injection well. This plant is now a part of the East Texas Salt Water Disposal Co. system, operation of which is described in an engineering series starting in this issue, page 175

¶First kerosene deliveries, by box cars, reach East Coast. . . . ¶Volume last week, 11,703 bbl., PAW plans to increase movement to 6,500 bbl. daily. . . . ¶Overland movement of all oils, a week ago, averaged 818,331 bbl. daily, slight drop of 4,506 bbl. from previous report. . . . ¶Pipe lines moving 155.000 bbl. daily to East Coast. without 24-in. WEP, which is being tested north. . . .

SUPPLIES—Draft on East Coast inventories continues heavy. . . . ¶Ban on nonessential driving, tighter control of coupons, reduced fuel-oil rations—ALL combined, brighten future outlook. . . .

DIRECTIVES—Service-station operating hours limited to either maximum of 12 daily or minimum of 24. . . . ¶Order written, BUT, so far, unissued, telling suppliers when, where, to whom and what products are to be delivered. . . .

Report on Production Costs Shows Wide Disparity Among Fields

by Henry D. Ralph

WASHINGTON, D. C.—A detailed report on the cost of producing crude petroleum in the United States was submitted to the Office of Price Administration by the U. S. Tariff Commission January 27 after more than a year of investigation.

The report makes no conclusions about the price of oil other than that prices should be adjusted by fields because national and regional averages are misleading. The report contains 250 pages, mostly statistical tables giving details on every important field in the country for 1939, 1940 and the first 9 months of 1941. A supplemental investigation covering representative producers for the first half of 1942 is not yet completely tabulated but indicates that average costs in the second quarter of 1942 were somewhat higher than the third quarter of 1941, which in turn were only slightly above the 1940 average.

A summary table for the country as a whole through the third quarter of 1941 indicates that oil production was progressively more profitable from start of the war. The average margin between net cost and sales price per barrel at the well was 23.7 cents in 1939; 25.9 in 1940; 27.3 the first quarter of 1941; 36.8 the second quarter; and 40.7 cents the third quarter. The report points out, however, that decreases in average net cost per barrel in many fields was due to increased production, and vice versa. Subsequent declines in production may reverse the trend.

For the third quarter of 1941, the following figures show per-barrel average-sales value at posted-field prices, net cost of production, and margin between the two:

	Value	Cost	Margin
California	$1.025	$0.587	$0.438
Rocky Mountain	.982	.470	.512
Mid-Continent Gulf	1.158	.828	.330
Illinois	1.355	.627	.728
Eastern	1.992	1.458	.534
All United States	1.171	.764	.407

The report stressed that changes in net cost per barrel within a pool at different periods may be attributed largely to fluctuations in volume of production and particularly that data on costs, prices and margins differ widely for individual pools within each region. To cite one example, in Oklahoma the lowest average net cost for the first 9 months of 1941 was 51 cents for the Ramsey pool where the daily output per well is high. The highest was $1.92 for the Fitts pool where secondary methods of recovery are used and the output per well is low. The average for the state was 92 cents. Margins ranged from a "loss" of 80 cents for the Fitts pool to a "profit" of 68 cents for the Ramsey pool. Similar discrepancies were cited for other areas.

In the majority of fields, the report said, the average value per barrel was substantially above the average net cost during the period of the investigation. Some outstanding excep-

Another vote for higher crude prices was cast by these officers, executive committeemen, and guests at the Independent Petroleum Association of America meeting last week in Houston, Tex. Standing: Paul Halliburton, Halliburton Oil Well Cementing Co.; Walter Goldston, independent, both of Houston; R. J. O'Brien, Shreveport, La.; John B. Cowden, Dallas, Tex.; E. C. Moriarty, Wichita, Kans.; Harry Leonard, Roswell, N. M.; Merle Becker, St. Louis, Mo., and R. J. St. Germain, Houston. Seated: J. C. Graves, Saginaw, Mich.; Al Buchanan, San Antonio, Tex.; C. E. Buchner, Tulsa, executive manager; Russell B. Brown, Washington, D. C., general counsel; H. R. Cullen, Houston, vice president of the Southeast Texas district; Frank Buttram, Oklahoma City, president; Harold B. Fell, Ardmore, Okla., executive vice president, and Charles F. Roeser, Fort Worth, Tex., former president, now chairman of production for District 3

tions where the cost was above value all or much of the period covered were heavy oil fields in California, the Rodessa (Louisiana) pool, western Kentucky, and Ohio.

Preliminary computation of later costs reported by selected representative producers indicates that for the entire country, on the average, production cost increased about 10 per cent between the third quarter of 1941 and the second quarter of 1942. In 20 pools studied in 1942, average net cost per well increased in 14 pools from 0.8 cent to 15.5 cents per barrel, primarily due to decreases in production, while in six pools costs decreased from 0.3 cent to 8.6 cents per barrel.

Navy Establishes "Pool" For Armed Forces Oil Needs

WASHINGTON, D. C.—Avoidance of future maladjustment of East Coast supplies by any unpredictable demands for products at North Atlantic ports is sought in a new policy announced last week by military forces. Procurement of military requirements of petroleum products in the future will come largely under supervision of the Navy in a general program to coordinate purchases of materials and supplies.

This collaboration in the procurement and transportation of petroleum and oil products is the latest instance of joint Army-Navy action. The acute shortage of oil has made it necessary to carefully allocate supplies and a petroleum "pool" has been established on the East Coast, a War Department announcement disclosed.

Steel Allocated For New 20-in. Products Pipe Line

WASHINGTON, D. C. — Steel for the 836-mile, 20-in. war emergency products pipe line from the Beaumont-Houston, Tex., area to Seymour, Ind., was allocated by the War Production Board January 27.

War Emergency Pipelines, Inc., the organization created to build and operate the 24-in. system from Longview, Tex., to the New York-Philadelphia refinery district, will function in the same capacity on the new products line. Petroleum Administrator Ickes has notified WPB that he will report in early May whether he thinks the new 20-in. line should be extended 676 miles from Indiana to the New York-Philadelphia area.

Steel required for the first section of 836 miles is estimated at 164,000 tons.

Cost of the line is estimated at $44,000,000 and completion is tentatively scheduled for September 1. A net increase of 110,000 bbl. of products daily moving to the Atlantic seaboard is anticipated by construction of the line.

Special Material Directives Withheld on Rubber Plants

WASHINGTON, D. C.—WPB has issued directives for early completion of 55 per cent of the synthetic-rubber program but there is still a controversy over the balance, Chairman Donald M. Nelson told the Gillette investigating committee of the Senate January 26.

He explained component parts are needed equally by the merchant ship, escort vessel, 100-octane gasoline, and aircraft plants and all five are in conflict but of such equal urgency that no one can be favored over the others.

Rubber Director Jeffers complained early in December that the rubber program was a month behind schedule and after thorough investigation Mr. Nelson said he issued special directives for immediate fabrication of component parts to build up 55 per cent of the butadiene, styrene, and copolymer plants called for in the Baruch report. He said he estimated this would be sufficient to care for the rubber needs of the military, Allies, and essential transportation, though rubber supplies will be critically short between October and December, and that rubber for civilians can wait until the balance of the program is completed late in 1943 or early in 1944. This 55 per cent was carefully sequented with certain 100-octane plants to make a workable fabricating schedule and he felt that further expediting the rubber plants would disrupt the other programs. This was done without the approval of Army and Navy but they have since concurred.

Mr. Nelson admitted that Director Jeffers wants the directives extended to 65 or 70 per cent of the program but he has referred this decision to the chief of staff and the president. Beyond this, he said, there is no disagreement over the rubber program except the inevitable competition for equipment.

Referring to a statement made by Mr. Jeffers in Baltimore January 25 that Army and Navy expediters are delaying the program, Mr. Nelson said this was true a few months ago but the system has been changed and where it is found such instances still exist steps are taken to correct them.

The WPB chairman told the committee that the 100-octane program is behind the requirements and that better gasolines are needed. He declined to discuss this matter in open session but asserted the program is very urgent and important.

All synthetic-rubber and feed-stock plants can be completed during 1943 in spite of competition for materials from aviation gasoline and other programs, the Gillette committee was told January 25 by Michael J. Madigan, special assistant to the under secretary of war.

Until last September, Mr. Madigan had been on loan to Rubber Reserve Co. to supervise construction of its plant program and in that capacity testified before the Gillette committee in July. At that time his schedule called for completing all butadiene plants by August or September 1943, and he said last Monday that even with all delays now probable all construction should be completed by the end of the year. He admitted that this might not permit production of enough synthetic rubber to prevent depletion of stocks this fall. He said the first completion he scheduled was the alcohol plant at Institute, W. Va., on January 1, 1943. He is now advised this will come in on February 1 and that delay of 30 days on a plant that size is not a bad record.

He said alcohol-butadiene plants were ahead of petroleum processes because Carbide & Carbon presented a well worked out process and detailed engineering plans and bills of materials, while those in charge of petroleum processes apparently under estimated the amount of engineering required. He added that he expected the alcohol plants to produce 25 per cent more butadiene than their rated capacities and that the petroleum plants might do as well, pointing out that the petroleum toluene plant at Baytown, Tex., is producing 100 per cent more than rated capacity and it was designed by the same people building some of the butadiene plants.

Asked about competition, Mr. Madigan said the synthetic-rubber program is in direct competition with the 100-octane, escort vessel, chemical warfare, and other programs for materials and fabricating facilities for such components as valves, heat exchangers, compressors, and instruments, and that they all should move along together. He refused to discuss competition for butylenes, but said he would assume enough crude oil could be processed to meet demands of both aviation gasoline and butadiene. The 100-octane program has been expanded twice since last fall, he said, and promised to give the committee a confidential report on that program.

Fuel Requirements Force Blending of Light Oils

MILWAUKEE, Wis.—Necessity of blending light burning oils with residuals in order to meet fuel requirements of military forces and war plants was cited here last week by Petroleum Administrator Harold Ickes as the basic reason why rationing is necessary in the Middle West. This explanation of fuel-oil restrictions was made in a paper prepared for delivery before the annual meeting of the Wisconsin Petroleum Association here January 21.

Since citing the necessity for blending light oils with residuals to increase the over-all supply of fuel, the Office of Price Administration has adjusted Mid-Continent price ceilings to encourage the practice.

Part of the blame for current drafts on Middle West crude-oil stocks in order to meet refining requirements was placed by the petroleum administrator on the "sinfully wasteful Illinois production practices, where fields have been gutted beyond all hope of repair by those who, in contemptuous defiance of national interest, fought adoption of wise conservation laws."

The oil administrator attempted to allay fears that consolidation of supplies, facilities and distribution would work a hardship on the smaller units in the industry.

"I state unqualifiedly," he declared, "that we propose to move in the direction of consolidations only in the event of absolute necessity and then only after having given full consideration to the equities involved." As a general backdrop for his explanation of the need for rationing in the Middle West, Administrator Ickes reported that stocks of all oils were 17 to 40 per cent lower now in District 2 than they were a year ago. Light fuel oil, which is approximately level with the 1942 position, is the only product which has not lost ground. Crude inventories are 84 per cent of 1942, residual stocks are down 40 per cent and gasoline on hand is 4,900,000 bbl. less than a year ago.

Much of the paper was devoted to transportation problems and to the actions taken to overcome this deficiency. Approximately 1,000,000 bbl. daily are being moved by alternate routes into the East Coast area, he said, and paid tribute to Middle West operators for diverting about 30,000 tank cars to overland traffic which normally were used in the central states.

Experience has shown, Mr. Ickes said, that one motor transport is the equivalent of about six tank cars on short hauls. Instances are on record where one motor truck has been the equal of 25 tank cars. He cited relative figures on the value of truck transport in connection with an appeal that Wisconsin modify its highway laws to permit maximum use of tank trucks and trailers.

Petroleum-Production Quota Increased To 4,162,300 Bbl. Daily in February

INCREASES totaling 39,500 bbl. assigned last week to producing states in three Petroleum Administration for War districts for February were moderately offset by decreased quotas in the other two areas. But the national total rose 38,100 bbl. over PAW's January authorization. Authorized production next month totals 4,162,300 bbl. daily.

Most of the increased production quota assigned by PAW was to producing states in District 3 where the February allowable for all petroleum liquids was increased to 2,036,300 bbl. daily, a gain of 23,400 bbl. Texas was assigned 25,200 bbl. of the daily increase, lifting the quota for that state to 1,452,000 bbl. per day. Louisiana was allocated 2,300 bbl. of the daily increase, New Mexico's quota was raised 500 bbl. and Arkansas was accorded a gain of 400 bbl. Mississippi's quota of 50,000 bbl. daily in February is unchanged and reflects little in production prospects because the state has not observed PAW allowables since the federal oil agency started making allocations.

California's allowable was increased 8,700 bbl. daily to a new peak of 823,700 bbl. and District 1, reflecting new supplies now available in West Virginia, gained 2,400 bbl. to a total quota of 85,500 bbl. per day in February.

An increase of 4,800 bbl. in the daily quota assigned Kentucky and a more moderate rise of 500 bbl. in the Kansas allowable failed to offset lower allocations in Illinois, Nebraska, Ohio and Oklahoma which was reduced 5,300 bbl. in the February schedule.

Certified Production Rates

(Barrels per day)

	Total petroleum liquids		
	Feb. 1943	Jan. 1943	Feb. 1942 Actual prod.
Dist. 1:			
New York	15,400	15,400	14,500
Pennsylvania	50,700	50,700	49,000
W. Virginia	19,400	17,000	16,900
Total	85,500	83,100	80,400
Dist. 2:			
Illinois	272,200	272,600	357,700
Indiana	17,200	17,200	18,600
Kansas	310,500	310,000	244,800
Kentucky	19,000	14,200	12,900
Michigan	63,700	63,700	49,500
Nebraska	3,000	3,400	4,200
Ohio	10,100	10,300	10,000
Oklahoma	395,300	400,600	422,000
Total	1,091,000	1,092,000	1,119,700
Dist. 3:			
Arkansas	78,700	78,300	76,300
Louisiana	349,800	347,500	361,800
Mississippi	50,000	50,000	92,900
New Mexico	105,800	105,300	115,500
Texas	1,452,000	1,426,800	1,662,800
Total	2,036,300	2,007,900	2,309,300
Dist. 4:			
Colorado	7,000	7,000	5,200
Montana	24,700	24,700	22,300
Wyoming	94,100	94,500	83,800
Total	125,800	126,200	111,300
Dist. 5:			
California	823,700	815,000	690,600
Total U. S.	4,162,300	4,124,200	4,311,500

Moroney Becomes Officer of Sinclair-Wyoming Oil Co.

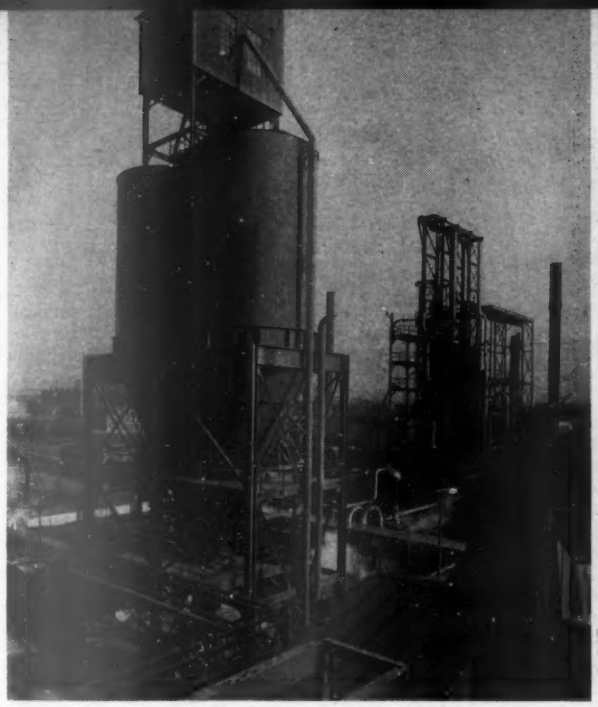
J. P. Moroney was elected a vice president and director of Sinclair-Wyoming Oil Co. at the annual meeting held in Tulsa last week, it was announced by W. L. Connelly, chairman.

For several years Mr. Moroney has been general district representative of the Sinclair-Wyoming company in the Rocky Mountain area, with headquarters at Casper, Wyo., where he will continue his headquarters.

Mr. Moroney was first employed by Prairie Oil & Gas Co. on August 1, 1926, and has had wide experience in various oil-field positions, with both the Prairie and Sinclair companies. During the early days of the Burbank field he was stationed at Pawhuska, Okla.

Mr. Moroney is the son of J. J. Moroney, newspaper editor and publisher, of Okmulgee, Okla.

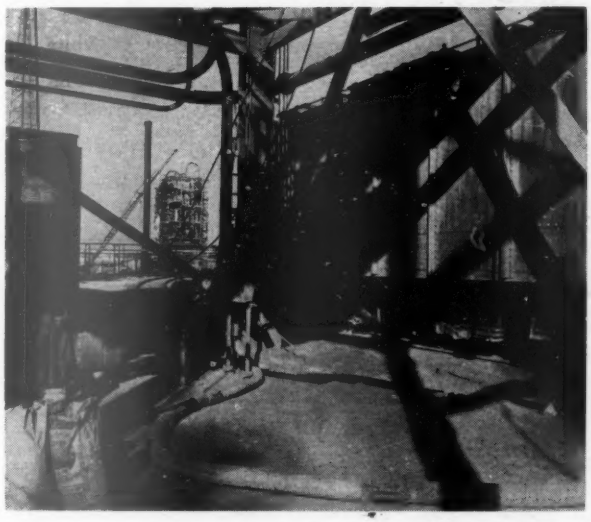
Mr. Connelly calls attention to the fact that this is the first time since he left Wyoming, that an officer of Sinclair-Wyoming Oil Co. has been located in that state.



Above: View of catalyst hoppers at the new fluid catalytic cracking plant of Standard Oil Co. of New Jersey, at Bayway

These huge transfer lines show the magnitude of the first eastern fluid catalytic cracking plant dedicated last week

Below: So large are the quantities of catalyst used in the plant that they are fed into the catalyst hopper by carload



CAMERA HIGHLIGHTS

Below: Workmen receive the Army-Navy "E" award pennant presented to Shell Oil Co., Inc., at its Wood River, Ill., refinery

Above: Alexander Fraser, Shell president, addressing workmen at ceremonies. Below: R. C. Roberts, manager of the Wood River plant, and Mrs. James H. Doolittle

State Capitals

TEXAS

INJECTION of salt water back into the Woodbine sand from which it was produced in the East Texas field, increased sharply during December. Several drilling crews are now engaged in converting former oil wells to brine injection wells, indicating further increases may be expected.

Injections in December totaled 2,933,661 bbl. while in November they were 2,667,973 bbl. The number of oil wells connected to injection systems increased from 1,466 to 1,494 wells. Two additional companies began injecting water to bring the total to 46. All of the 44 companies previously operating reported substantial increases in the amount of water handled.

The East Texas Salt Water Disposal Co. recently acquired the Stanolind 6 C. C. Christian in addition to four other wells in the process of conversion. Humble Oil & Refining Co., General American Oil Co., J. J. Perkins-Prothro Co., and Cities Service Oil Co. have all asked permission to convert oil wells to salt-water injection service.

TWO BILLS affecting the oil industry were introduced in the Texas Legislature last week. The first, by Rep. Donald Markle of Galveston, would prevent pollution of coastal waters by petroleum, gasoline or other substances. Roger Knight, Madisonville, sponsored a bill to allow the Railroad Commission to prorate wells producing natural gas or distillates without regard to the present minimum of 25 per cent of the open-flow capacity.

THE NEXT state-wide hearing will be held in Fort Worth between February 15 and 20, the exact date to be announced later.

THE FEBRUARY proration order was issued last week by the Railroad Commission and while it edged over the federal daily quota 714 bbl. it was 168,660 bbl. under pipe-line nominations.

The only area to receive a substantial increase was West Texas (District 8) an area in which the purchasers' nominations were met fully. February allowable was raised 25,994 bbl. daily.

Daily average allowable for the state was set at 1,452,714 bbl. of all oils of which 1,424,783 bbl. were assigned crude-oil producers and 116,553 bbl. daily were earmarked for natural gasoline and distillates. The calculated underproduction is 6.22 per cent which reduces the crude-oil allowable to 1,336,161 bbl. daily.

There will be 10 general shut down days with the Panhandle being held to only 6 shut-down days as will be the Emperor, Slaughter, and Waddell fields. East White Point will be shut in 4 days. Shut in 13 days during February will be Abell, Abell Permian, North Cowden (Deep), and South Cowden.

Three shut-down days were decreed for several premium-crude fields and others were authorized to produce the full 28 days.

Wells completed during February will be permitted to produce for the entire period covered by the schedules, wells may be produced over the entire period where physical waste will result but must not exceed the daily allowable multiplied by the number of producing days, and producers will be allowed to continue balancing their production so that the production of an individual will not exceed the total allowable of the wells involved.

Allowables by Districts for January and February

District—	February	January
1. Southwest	20,597	20,687
2. Southwest	82,690	82,247
3. Gulf Coast	282,325	286,724
4. Southwest	109,904	109,846
5. East Central	18,535	18,440
6. East Texas (outside)	87,345	85,678
6. East Texas	329,808	330,597
7-B. West Central	27,436	27,108
7-C. West Central	18,630	18,535
8. West Texas	216,481	189,721
9. North Texas	126,312	125,108
10. Panhandle	98,730	97,053

ILLINOIS

THE ILLINOIS Supreme Court ruled last week that a deed to coal, oil, gas and other mineral rights includes the right to use the surface to drill for oil. Express permission to conduct such drilling is not required in such a deed, the court held.

In its decision, the court declared: "There appears to be little doubt that when the mineral estate is severed from the surface estate all means to attain it are also granted for the purpose of enjoying it.

"This is because it is presumed the grantor intended to convey and the grantee expected to receive, the full benefit of the mineral estate, and therefore the grantor not only conveyed the thing specifically described but all other rights and privileges necessary to the enjoyment of the thing granted."

GEORGE F. BARRETT, Illinois attorney general, will be asked soon to approve a proposal that oil operators be required to dispose of salt water, more than ¼ mile from mine property.

The proposal will be submitted by Samuel F. Peterson, petroleum engineer of the state Oil and Gas Conservation Division, following its approval by a meeting of 22 oil and coal operators in Springfield, Ill., last week. The plan would go into operation through an order of the state Oil and Gas Division if the attorney general approves it, Mr. Peterson said.

Mr. Peterson described as a serious problem the disposition of salt water in the Centralia field. In the northern section, he said, up to 20,000 bbl. must be disposed of daily.

CALIFORNIA

PROMOTIONS of two men in the District 5 office of the Petroleum Administrator for War were announced last week. The new assignments of duty resulted from transfer of Comdr.

EUGENE L. DAVIS

C. B. GARRETSON

W. H. Osgood, formerly director in charge of District 5, to his new post as senior officer in charge of the Naval Oil Reserve in California.

Charles B. Garretson, first alternate director in charge, becomes acting director of District 5, and Eugene L. Davis, previously chief of the petroleum-production section, is promoted to acting director of the Production Division. Commander Osgood formerly held both positions.

KANSAS

APPLICATION of United Carbon Co., Inc., for permission to construct additional facilities for the manufacture of carbon black in Grant County, Kansas, and to utilize gas from the Hugoton field in the proposed operation will be reviewed at a Corporation Commission hearing in Topeka, at 9:30 a.m., February 1.

Federal Order Digest

Petroleum Administrative Orders

Drilling Equipment—PAO 6: Bans the use of materials to drill, complete or provide additions to any well in the Hugoton gas field of Kansas and Oklahoma, effective January 23.

Transportation — PAO 5: Prevents use of tank cars for shipments of gasoline originating in other districts to points in the 17 eastern states and District of Columbia, effective January 21.

Credit Sales — PD-62, amended: Stops extension of credit at gasoline service stations in connection with the sale of any petroleum product, except for government vehicles, commercial use of motor boats or for motor vehicles displaying "T" ration stickers, effective January 21.

Fuel Oil—PAO 3: Stops delivery of fuel oil to commercial, industrial and governmental consumers whose current 3-month ration for nonheating purposes exceeds 9,000 gal., effective February 2.

Service Stations—PAO 4: Requires service-station operators to stay open not more than 72 hours a week (maximum 12 hours daily), or to offer service 24 hours a day, 7 days a week, effective January 23.

WPB Priority Regulations

Oil-Field Materials — P-98-d: Revokes order pertaining to priority assistance for materials sent to foreign countries, effective January 20.

Equipment — PR 9, amended: Requires oil operators to use only Form PD-311 or PD-311-c, whichever is applicable, to seek priority assistance for materials to be used in foreign countries as maintenance, repair and operating supplies and for production equipment, effective January 20.

WPB Limitation Orders

Valves — L-252: Reduces the number of gate, globe, angle, cross and check valves now produced from 4,079 to 2,504; prohibits use of brass in valves larger than 2 in., effective January 23.

Construction Equipment — L-217, Schedules 3 and 4: Prohibits use of alloy steel in angledozers, bulldozers and in repair parts for both items, effective February 1.

Antifreeze Solutions — L-258: Forbids manufacture of antifreeze No. 3 solutions compounded with inorganic salts or petroleum distillates, effective January 20.

OPA Rationing Orders

Bulk Consumers—RO 5-C, Amendment 14: Voids bulk coupons issued December 1, as of January 22; requires reexamination of rations issued through old type 100-gal. coupons in eastern area, effective January 22.

Fuel Oil — RO 11, Amendment 29: Bans delivery of fuel oil to commercial, industrial and governmental consumers whose current 3-month ration for nonheating purposes exceeds 9,000 gal., effective February 2.

Commercial Gasoline — RO 5-C, Amendment 16: Provides for extension of temporary transport rations beyond January 31, if ODT certificate has not been received or application denied and, if appeal is pending from ODT certificate allowance, effective January 23.

Maximum Price Orders

Testing Instruments — MPR 136, Amendment 67: Places instruments for measuring, testing, recording and indicating and other precision devices which are motivated by electricity but do not measure electrical quantity under machinery regulation, effective January 27.

Commodities and Services — GMPR 1, SR 1, Amendment 50: Exempts dehydrogenation catalysts and catalyst carriers when sold for use in the production of synthetic rubber, effective January 23.

WPB Announcements

Trailers — Says 250,000, including sizes from the smallest to the largest, tentatively projected for 1943. Truck Tailer Industry Advisory Committee schedules next meeting in Washington, D. C., February 11. Total of 1,217 trucks, trailer and miscellaneous vehicles released under truck-rationing program during week ended January 16.

Tires—Broken-down condition of a large proportion of tires turned in by motorists under Idle Tire Purchase Plan emphasizes necessity for periodic inspections to extend life of tires now on cars.

Controlled Materials Plan—Manufacturers urged to file completed CMP-4A and 4B forms by February 9 in order to obtain allotment numbers in obtaining materials for second quarter. Orders bearing allotment numbers will take precedence over those bearing only preference ratings.

Personnel Changes—Curtis E. Calder, native of Winfield, Kans., president of the American and Foreign Power Co., Inc., and at one time president of Texas Power & Light Co., succeeds Ernest Kanzler as WPB director general for operations; Dr. E. W. Reid, another native Kansas, formerly senior industrial fellow for Mellon Institute of Industrial Research, director of European affairs for Union Carbide & Carbon Co., more recently chief of WPB's chemicals branch, now succeeds Mr. Calder as deputy director general for industry divisions.

Transportation Regulations

Motor Vehicles—EO 21-5: Exempts certain unlicensed and limited-licensed commercial vehicles from necessity of having tires inspected, effective January 18.

1942 INDEX READY SOON

The complete editorial index of The Oil and Gas Journal for 1942 will be off the presses this month but, deviating from previous custom, it will not be incorporated in a regular issue. The 1942 index, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

Station Operating Hours Regulated by New Order

WASHINGTON, D. C. — Regulated hours of service-station operation became effective throughout the country January 23 under terms of Petroleum Administrative Order 4.

Service-station operators now have two optional methods of operation under terms of the order.

1. The station may stay open not more than 72 hours a week, and for not more than 12 hours a day; or

2. The station may stay open 24 hours a day, or 7 days a week. Deputy Petroleum Administrator Ralph K. Davies said the 24-hour-a-day alternative will permit so-called "truck stations" to serve common carrier trucks and other "T" card holders. Continuous operation is required of these dealers so as to effect maximum service from the stations.

Provisions of the order include the following:

All service stations must post opening and closing hours in a conspicuous place.

If a dealer elects to operate for 72 hours a week, he must serve all customers for no more than a total of 12 hours in any 1 day. The 12 hours may not be divided into units of less than 2 consecutive hours.

If a dealer elects to remain open 24 hours a day, he must serve all customers for 12 consecutive hours for 6 days of the week. Only "T" card holders may be served during the remaining periods.

If a dealer elects to operate 72 hours a week, he must maintain this schedule for at least 7 consecutive days before he may change over to the 24-hours-a-day, 7-days-a-week basis.

Producers Declare 50-Cent Crude Rise Is Necessary

OKLAHOMA CITY, Okla. — Assertions that a crude-oil price increase of at least 50 cents per barrel is necessary to maintain production and find the required new fields were sprinkled liberally through the record of the special Senate committee investigating oil conditions here last week. The committee, headed by Sen. Bennett C. Clark of Missouri, was represented at the Oklahoma City hearing by Sen. Clyde M. Reed of Kansas. Previously, the two senators had conducted similar hearings at Kansas City, Mo., where the fuel-oil supply situation was the chief topic.

Numerous independent producers, refiners, drilling contractors and representatives of other branches of the industry, testified before Senator Reed concerning the rising costs and the depressing influence of retrograde economics on exploration.

A prediction that improvements will come this year in the petroleum operators' economic position was made by Senator Reed based on "pretty definite assurance" he received before leaving Washington that oil prices would be "adjusted."

J. Steve Anderson, Oklahoma City, vice president of the Anderson-Prichard Oil Corp., criticized the complexities of Conservation Order M-68 as stifling drilling and production. He said that the recent order banning tank-car deliveries of gasoline to the East Coast struck "like a bomb to us," adding that "we don't know" what will be done with the gasoline made as an inescapable result of refining. Mr. Anderson estimated the cost of finding new reserves at 50 cents per barrel.

Gov. Robert Kerr, an oil producer, testified concerning the declining production in Oklahoma. He commended Harold L. Ickes for the job he is doing and said that he felt an oil price increase would have been forthcoming much earlier if the petroleum administrator's advice had been followed.

Don Oak, Tulsa, petroleum engineer and producer, declared that a vast amount of oil could be recovered from stripper areas by repressuring but that it could not be done economically at the present price for crude.

L. B. Jackson, another Tulsan, reported that 26 out of 181 wells he operates in the Sapulpa area lost money last year. He calculated the cost of pumping the wells at 93 cents per barrel. An increase of 50 cents would permit drilling more wells, he said, and while they would not be large producers they would help in the critical supply situation. Furthermore, the unprofitable wells could be continued indefinitely at higher prices.

Cost of recovering oil from wells operated by Phillips & Milan, Tulsa, in Nowata County, Oklahoma, was said to be $1.15 per barrel. W. G. Phillips, one of the partners, said that on an investment of $670,000, the 1942 profit was $8,217, not counting any salary for the partners.

The projected program of 16,000 wells in 1943 was declared inadequate by Frank Buttram, Oklahoma City, president of the Independent Petroleum Association of America. Criticism was also leveled at the "indeterminate number of questionnaires and necessity of answering questions of income-tax investigators" all of which, Mr. Buttram said, required about 25 per cent of the time of his office staff.

W. A. Delaney of Ada, Okla., said he had operated oil properties for 25 years "but I can't keep it up in the face of what goes on today in Washington." He advocated a price increase to make wildcatting profitable and added, "we don't want subsidies because when you take money from a politician you are beholden to him and you can't run your own business."

Witnesses urged Senator Reed to take action on the critical manpower situation. He promised to continue his fight for a 48-hour week and added that "by that I don't mean overtime for the 8 hours in excess of 40."

J. E. Coleman, Wichita Falls, Tex., a petroleum engineer, declared that the "fat" on which the oil industry has been existing for a year is "about used up" and said that we are going to run into shortages before long.

DEATHS

Glen H. Cross, 45, credit manager of Richfield Oil Co., Los Angeles, Calif., died last week at his home in Los Angeles. Death was caused by acute cardiac dilation and coronary sclerosis.

George Frater Sharp, for many years telegraph operator in the office of the Southwest Pennsylvania Pipe Lines at Washington, Pa., died suddenly at his home last week. He started work as a telegraph operator on the pipe lines in 1903 and since the dissolution of the Standard Oil companies has been with Southwest lines. Surviving are two daughters and one son, George Franklin Sharp.

William H. McFrederick, 68, a retired field supervisor for Standard Oil Co. of Texas, died last week in a San Antonio, Tex., hospital. A native of Ohio, he had lived in San Antonio for 7 years. His widow survives.

William J. Bates, 60, Derrick City, Pa., died last week at his home after a month's illness. He had been employed by Quaker State Refining Co. His widow, two sons and a daughter survive.

James Wade, 71, of Petrolia, Ont., died recently at Sarnia, Ont. Learning the drilling trade as a boy, he worked for Walker Oil & Gas Co. at Bothwell, Ont., and later on foreign drilling contracts in Newfoundland, West Africa, Egypt and South America. He retired about 18 years ago.

James T. Parshall, 68, retired oil operator of Wichita, Kans., died last week in a Wichita hospital. He is survived by two sons.

James E. Betz, 68, of United Natural Gas Co., Oil City, Pa., died at his home in Oil City last week following a short illness. He had been employed by the United company for more than 25 years. In addition to his widow, he is survived by a son and a daughter.

John H. Tucker, 58, general superintendent of production for Gulf Oil Corp., Houston, Tex., died in a Houston hospital last Thursday. Mr. Tucker had been with Gulf since 1904. His widow, two sons and three daughters survive.

S. S. Owens, 66, who is credited with drilling the first well in what later became the West Texas field, died Friday night in a Tulsa hospital. Mr. Owens entered the oil business when he was 18 years old. About 1910 he was a partner with Harry F. Sinclair and James P. Flannigan in forming the Victoria Oil Co., which developed Bird Creek to the northwest of Tulsa. Later he and Samuel Sloan organized the Owen-Sloan Oil Co., which in 1928 was sold to Magnolia Petroleum Co. His widow, three sons and three daughters survive.

Credit Sales Prohibited By Amended Directive

WASHINGTON, D. C.—In a move to tighten the extension of credit at gasoline service stations, Petroleum Administrator Ickes last week announced that Petroleum Directive 62 has been amended. The amendment is effective February 1.

Industry ENTITLED To PREFERRED POSITION

An exclusive statement on the petroleum outlook from the industry's highest ranking federal representative

by Ralph K. Davies

RALPH K. DAVIES
Deputy Petroleum Administrator

WE enter the second year of war. What lies ahead? What especially for the oil industry? This is not easily foreseen since the military future and all that is bound up in it is unknown and unknowable. Yet it is possible, it seems to me, to make out though in somewhat indistinct outline the more prominent features of the 1943 petroleum prospect. To the extent that anything of the kind is possible, it is desirable that it be done, that we may not be taken by surprise or be found unprepared.

In the first place, it seems certain that the demand for petroleum and its products will, in 1943, exceed the requirement of the past year. While various restrictions upon civilian consumption have now been applied, operating to reduce substantially the consumption of certain products in certain areas, the needs of the military forces and of industry have increased in more than offsetting amount and there is ample indication that greater war demands will be made in future months. As progress is made in overcoming shortage in transportation, more and more oil will flow to the battle fronts and to the industrial fronts at home supporting them. Thus we must base all forward-looking moves upon an indicated rise in the total demand and of substantial proportions. That this would exceed our national capacity to produce or refine, I doubt. But that it will tax our resources in certain places and will again strain our transportation facilities seems inevitable.

IN the face of an increased and increasing demand for oil, our greatest concern should be for the future of production—production of crude oil. It is obviously hazardous to spend more than is currently available unless there is an unlimited capital upon which to draw. In the case of oil, there is definitely not an unlimited reserve; on the contrary it is decidedly limited. To be drawing upon our underground inventory to the tune of half a billion barrels of crude oil a year is anything but reassuring as to the future. This trend must be stopped, if it can be stopped, and soon. Here lies the challenge to the oil industry of America. Can it discover additional deposits in amounts sufficient to at least offset the present drain on reserves, or must it go into a period of general decline?

OIL being the absolutely indispensable product, that it is in waging modern war, it would seem that this industry must somehow be provided with what it requires to do the most effective job possible. In the distribution of critical materials, it is entitled to a preferred position and it must have it. Of course, the competing demands of other war industry must be weighed against those of petroleum. But we must see to it that the practical requirements of increased production and development in this field are clearly and forcefully presented to those who have final responsibility for deciding the issues. This, the PAW is doing and will continue to do and the industry should likewise make known its needs clearly and emphatically. And this applies not alone to the need for materials but as well to the need for the various economic adjustments which changing conditions create. Whatever the final decision, let it not be said that the industry failed to speak out and to make known the requirements of its situation.

IN the field of transportation we know we shall be hard pressed in 1943. While much progress has been made by way of substitution of overland facilities for the tank ships now no longer available for domestic use, the transition is not complete and will not be completed this year. The first large pipe line from Texas to the eastern seaboard will be in operation through to the Atlantic Coast by midyear; it will be handling 300,000 bbl. daily as far as Norris City, Ill., within the next week or two. But one large pipe line is not sufficient. A second one must be constructed and if commenced now will not be in operation before the latter part of 1943. Application for the required material for this second line has been made by the Petroleum Administration and awaits approval by the WPB. The efficiency of tank-car operation has improved under the critical necessity for moving an absolute maximum by this means. But there are definite physical limitations and the possibilities of tank-car transportation are now pretty well realized.

SO long as shortages in transportation continue the oil operation is bound to be thrown out of gear. When products cannot freely be moved from refineries, there result problems of storage, the balancing of refinery yields, etc. When adequate supplies cannot be made available at the point of consumption, the established economics of the industry are upset in numerous ways and problems of the most complex character inevitably arise. When one single operation in any branch of the industry is interrupted, the interacting effect is apt to be felt throughout every branch. There is no maintaining a normal refinery operation or production operation if the transportation system be disorganized and transportation is bound to remain a problem more or less critical over the year. Thus we must anticipate continuing need for all manner of adjustments to meet the interacting effect of physical deficiencies at least in transportation and critical materials.

If we have a tough year ahead—and I am sure we do have—we are, I think, well prepared for it with government and industry forces combined in the fight for a common cause.

the OIL AND GAS JOURNAL

PRODUCTION - TRANSPORTATION
REFINING - NATURAL GASOLINE

Founded in 1910 by
PATRICK C. BOYLE

Petroleum's Path Clearly Defined

IN this issue the Journal's editors review what has happened over the past year and with this background and the information at hand as a new year starts, take a look at the future.

There are certain basic facts which stand out unmistakably in petroleum's varied war activities and they point to the path that should be followed and the dangers if the directions are ignored.

Production of crude petroleum last year aggregated 1,384 million barrels, within a few million barrels of the record-breaking total of 1941. The output of natural gasoline greatly increased so that the 1,467-million-barrel production of liquid petroleum exceeded that of any previous year.

The demand figures are even more impressive. Because of the restrictions which the war brought to foreign operations, petroleum imports to this country decreased while exports expanded. Thus despite the record domestic supply, it was necessary to withdraw 58 million barrels of crude oil and refinery products from storage.

These demand reports should silence for all time those at Washington who in their early war planning decided that a large part of petroleum consumption by civilians in this country was a luxury which could be dispensed with during a national emergency.

To conserve rubber and because of successful enemy attacks on tanker transportation, gasoline use by the family car has been greatly reduced. A transportation shortage has also necessitated curtailments in fuel-oil consumption in 30 states.

At the same time it has been mandatory that many old and new civilian outlets for oil be expanded because of war needs. There are no substitutes for oil comparable in costs and service War agencies found that out during the spring months of last year when they brought about a reduction in crude production and refinery operations which was accompanied by an alarming contraction in inventories. Allowable production has been increased but at no time since last February has the supply been equal to the demand.

As a net result stocks of all oils at the start of this year were the lowest of that date since 1924 and nearly 200 million barrels under those of 1930 when demand was 50 per cent less than that assured for this year.

Now a word about what has taken place underground. To conserve materials, drilling last year was curtailed 40 per cent. This in effect meant that while producing more petroleum than ever before drilling operations were 60 per cent normal—a development which was not so important in relation to oil supplies last year as it will be this year and later.

The past year was one of the most unsatisfactory in new discoveries in the modern history of the oil business. Over 3,000 wildcat tests were drilled. A total of 220 new fields were reported and the new reserves credited to these discoveries—none of major importance—at the start of the year represented less than one-fourth the national crude-oil production for the 12-month period. The additions to established reserves, due to the extension of existing pools, were less than the average of recent years, a development brought about partially by the restrictions in drilling and by arbitrary regulations in regard to well spacing.

So the industry with the greatest demand re-

sponsibilities in its history looks over its records and finds that the new oil found last year was 60 per cent of the oil brought to the surface.

This country, through the encouragement and support given producers, has strengthened its position in regard to practically all essential war machinery and goods but so long as it directs petroleum operations so that reserves are being liquidated, its oil position is weakening—a direct threat to the winning of the war and to the winning of the peace.

Petroleum manufacturers have done an outstanding job. They produced more natural gasoline than ever before last year. Despite the drastic curtailments that were necessary for a time at many plants owing to transportation conditions, they ended the year with crude runs to stills only a few per cent under the 1941 record levels. The more than 450 refineries operated continuously.

Because of daily publicity everyone knows that these same refiners have the major burden in the production of synthetic-rubber materials, the most difficult manufacturing problem of the war which must be solved this year.

Likewise, the public knows something about the accomplishments of the transportation division when overnight the coastwise tanker movement of one and one-quarter million barrels daily from the Gulf to the Atlantic Coast was largely shut off. A 24-in. war-emergency line from the Southwest to the East will transport more oil than was produced in California during the other war.

Many more accomplishments of 1942 could be pointed to. But this is largely history and the oil industry and business generally are more interested in what will be done this year. Economists of the Government and the industry agree that the oil requirements of this country and the United Nations this year will exceed those of 1942. Just what the increase in this country will be is largely dependent on the progress of the war.

Right now projections point to an expansion of from 50 to 100 million barrels in required domestic crude-oil production this year. The government has suggested an increase of 50 per cent in wildcat operations with a reduction in total number of wells drilled. There are impossible features in this program which further emphasize the lack of balance between the number of wells drilled to find new oil and those required to develop proven areas. A greatly expanded drilling program will be necessary before the end of the year if further reductions in oil reserves are to be avoided.

The oil situation reflected in the Government's latest employment indexes which show all manufacturing industries at 154.8 and crude petroleum production at 55.1 cannot continue much longer without serious results.

Petroleum refiners have the task of completing the synthetic-rubber, aviation-gasoline, toluene and other war-production plans involving building programs which will total in excess of three-quarter billion dollars.

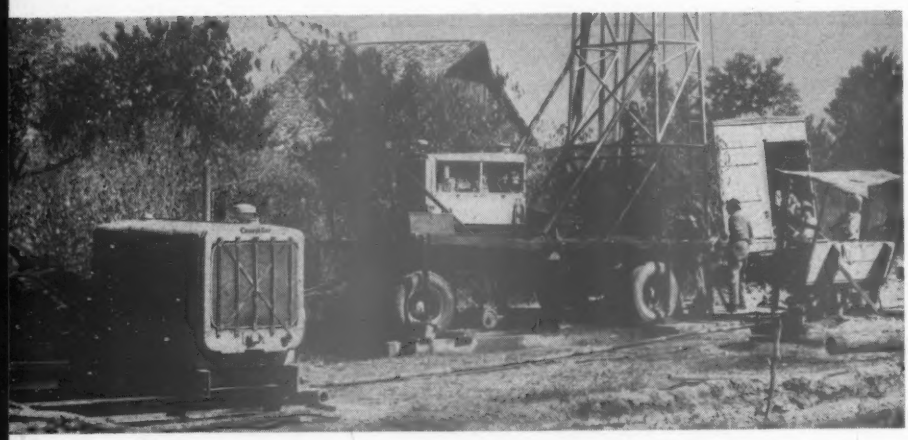
Refinery operations generally will be extended. Rationing in some petroleum uses will be more than offset with expansion in others. Emphasis in refinery operations will be placed on the heavier products requiring further adjustments in plant processing. Refiners to carry on these regular and extraordinary operations will have to have more materials and manpower than they have had through the year which has just closed.

Assuming a continuance of present tanker-transportation conditions, pipe-line construction in 1943 will exceed that of 1942. In addition to the completion of the emergency projects greater consideration will have to be given to the regular requirements and expansion of existing systems.

Finally, in 1943 more thought and action must be given to price, seemingly a taboo subject at Washington last year. The market summaries of this issue and the Government's own records can be cited to show what conditions are. The latest wholesale index report reveals that the average of all commodities was 100, an increase of 33 1/3 per cent since August, 1939. The index of petroleum and products was 60.6, the lowest of any of the major commodities. The index numbers of 103.4 for food, 103.8 for metals and 110.4 for building materials reflect the increased costs that have come to the petroleum industry.

It is vital to the entire war program and to the postwar adjustment period that this industry continue to function as it has in the past except for those operations which by their emergency nature must be financed and controlled by Government. Expressed in simple terms this means returns to operators commensurate with current and oncoming responsibilities, something they don't have after nearly 14 months of war.

PROVEN RESERVES



by W. V. Howard

PROVEN crude-oil reserves in the United States as of January 1, 1943, were 20,675,899,000 bbl. This is a decline of 543,140,000 bbl. from the revised estimates as of January 1, 1942, indicating that new oil found has again failed to balance withdrawals.

New fields accounted for 322,808,000 bbl. or less than one-quarter of the nation's production. Extensions added another 518,580,000 bbl. which is less than two-fifths of the annual production. In 1941, discoveries had estimated reserves of 486,935,000 bbl., or nearly 50 per cent more than was found last year while extensions made during 1941 had estimated reserves of 1,009,175,000 bbl., which is nearly double this year's extensions.

In the gloomy record of exploration, there were few bright spots. Colorado and New Mexico finished the year with more oil in reserve than at the beginning, due mainly to an extension of Wilson Creek and the discovery of Square Lake. In North Louisiana there was also an increase in reserves due to the development of the Pettit pay in Haynesville but this was more than offset by the decline in coastal Louisiana.

California had the largest net loss owing to the failure of an extensive wildcatting campaign to produce important results, coupled with considerable increase in production. This is reflected in a decline in years' supply of oil from 14.5 to 12.8, a figure which suggests that California will experience difficulty in maintaining this output.

In Texas, West Texas added 129,464,000 bbl. to its reserves while East Texas was losing 137,125,000 bbl. North and South Texas also showed small increases but these were offset by declines in the Gulf Coast, West Central, and the Panhandle. The years' supply in reserve in most of Texas increased, reflecting the decline in production, particularly in those areas adversely affected by lack of transportation facilities. The same factors accounted for an increase of 3.1 years' supply in reserve in New Mexico.

Mid-Continent and East

Oklahoma continued its decline in production and new reserves failed to meet this output by 81,301,000 bbl. or almost 60 per cent. The decline in production, however, was sufficiently large to permit a small increase in the years' supply at that rate. In spite of a good year, Kansas operators failed to find much over half of state's production and this together with an increased output lowered the years' supply from 11.4 to 9.3, a figure which suggests overproduction.

Illinois, Indiana, Michigan, Mississippi, and Nebraska all showed decided overproduction which strongly indicates an enforced decline in production from these states. This decline is, in fact now under way and with Oklahoma also declining an additional demand will have to be made on Arkansas, Texas, and New Mexico. During the next year, it is expected that Louisiana will take over third rank among the producing states from Oklahoma while Illinois will lose fifth place to Kansas.

The estimated reserves as of January 1, 1942, were revised completely

during the year and this revision resulted in a nation-wide increase. This was due in great part to a large reserve added to the recoverable oil in the East Texas field, owing to improved recovery methods. Another large reserve was added in Kansas where many pools have grown gradually without being credited with extensions. Failure of many stripper areas to decline has necessitated upward revision of the recoverable reserves. This increase, due to revision of reserves in old fields, has no bearing on the exploratory record of 1942, however. Nor does it greatly increase estimates of immediately recoverable oil as most of the fields involved are either producing to capacity or at a rate consistent with good engineering practice. If production in these fields is increased, much of the oil now recoverable will be lost and the next revision would be sharply downward in fields which are overproduced.

Examination of the record of 1942 immediately arouses the question of the future. The number of fields found in 1942 is about as large as in previous years so that the average reserve in each discovery is only about two-thirds as great as in 1941. This does not indicate that exploration in new areas is proving successful as the first fields found in these areas are generally large. The nearest approach to stepping out into new areas consists of a gradual edging out from known producing areas. There were no Tinsleys found last year.

Location of New Areas

In California, the northern extension of production in the San Joaquin Valley has not opened up any major fields and operators are turning to extending production in the east end of the coastal district and in redrilling several old heavy-oil fields. This will add to the state's capacity to produce but will not greatly increase recoverable reserves. In Wyoming, deep pays in old fields are of greatest interest except for the discovery of oil on the north side of the Denver basin. This may lead to a major development but attempts to duplicate the find on the Colorado side of the state line are not impressive.

In New Mexico the most important development is the discovery of trends parallel to the main Artesia-Vacuum group of fields. Many small accumulations have been found along these parallel trends but Square Lake is the first important discovery. In the Permian basin, the Ellenburger is proving of continually greater importance and the extension of productive trends to the northwest is adding major fields in the Permian pays. Along the Gulf Coast, the Wilcox trend is the only one which attracts much attention today and this has proved extremely spotty. Some good fields have been found but there is no indication at present of finding any of the 100,000,000-bbl. fields which are so badly needed.

North Central Texas continues very active with a large number of small fields discovered but nothing of major size has developed here since the

PROVEN OIL RESERVES ON JANUARY 1, 1943

(In thousands of barrels)

	Estimated reserves as of Jan. 1, 1942 (revised)	1942 Discoveries	1942 Extensions	Total	Less 1942 production	Estimated reserves as of Jan. 1, 1943	Gain or loss (—)	Years' supply as of Jan. 1, 1942	Years' supply as of Jan. 1, 1943	Per cent Jan. 1, 1943
California	3,350,609	12,850	79,250	3,442,709	248,395	3,194,314	—156,295	14.5	12.8	15.4
Southern	1,198,021	100	5,250	1,203,371	109,362	1,094,009	—104,012	11.5	10.0	5.3
Coastal	371,410	250	39,000	410,660	34,046	376,614	5,204	11.5	11.1	1.8
Northern	1,781,178	12,500	35,000	1,828,678	104,987	1,723,691	—57,487	19.0	16.4	8.3
Montana	99,508	200	.....	99,708	8,045	91,663	—7,845	13.5	11.4	0.4
Wyoming	359,649	3,800	2,680	366,129	32,736	333,393	—26,256	11.9	10.2	1.6
Colorado, Utah	29,597	.....	4,000	33,597	2,311	31,286	1,687	17.1	13.5	0.2
New Mexico	643,296	21,760	17,580	682,636	32,999	649,637	6,341	16.6	19.7	3.1
Texas	11,802,513	95,980	333,270	12,231,763	474,935	11,756,828	—45,685	23.7	24.8	56.9
Panhandle	664,468	.....	.....	664,468	31,113	633,355	—31,113	23.9	20.4	3.1
West	2,860,759	20,754	189,390	3,070,903	80,680	2,990,223	129,464	32.5	37.1	14.5
North	660,494	13,650	38,340	712,484	40,808	671,676	11,182	16.8	16.5	3.2
West Central	103,233	2,380	6,060	111,673	8,646	103,027	—206	10.7	11.9	0.5
East	3,591,594	7,786	7,280	3,606,660	152,191	3,454,469	—137,125	22.6	23.3	16.7
South	244,337	7,450	18,700	270,487	19,829	250,658	6,321	9.2	12.6	1.2
South Central	58,936	150	.....	59,086	5,331	53,755	—5,181	8.7	10.0	0.3
Lower Gulf	840,849	11,960	22,000	874,809	35,237	839,572	—1,277	20.0	23.8	4.1
Upper Gulf	2,777,843	31,850	51,500	2,861,193	101,100	2,760,093	—17,750	28.5	27.3	13.3
Louisiana	1,237,976	54,050	22,500	1,314,526	128,231	1,186,295	—51,681	10.7	9.2	5.8
Gulf Coast	952,920	12,050	17,000	981,970	95,731	886,239	—66,681	10.7	9.3	4.3
North	286,056	42,000	5,500	332,556	32,500	300,056	15,000	10.6	9.2	1.5
Arkansas	419,747	21,880	.....	441,627	26,566	415,061	—4,686	12.9	15.6	2.0
Mississippi	87,160	120	.....	87,280	27,546	59,734	—27,426	5.6	2.2	0.3
Oklahoma	1,202,527	48,860	6,600	1,257,987	136,761	1,121,226	—81,301	7.9	8.2	5.4
Kansas	941,938	15,600	36,160	993,698	96,879	896,819	—45,119	11.4	9.3	4.3
Nebraska, Missouri	2,928	.....	1,200	4,128	1,373	2,755	—173	1.5	2.0	0.0
Illinois	531,043	37,968	7,060	576,071	106,282	469,789	—61,254	4.1	2.2	2.3
Indiana	37,484	1,775	.....	39,259	6,620	32,639	—4,845	5.1	3.7	0.2
Kentucky, Tennessee	43,940	3,000	.....	46,940	4,627	42,313	—1,627	8.9	9.1	0.2
Michigan	87,533	3,585	8,280	99,398	21,537	77,861	—9,672	5.4	3.6	0.4
Ohio	36,852	1,380	.....	31,232	3,384	34,848	—2,004	10.9	10.3	0.2
West Virginia	34,620	.....	.....	34,620	3,492	31,128	—3,492	10.1	8.9	0.1
Pennsylvania	215,114	.....	.....	215,114	16,841	198,273	—16,841	12.9	11.8	1.0
New York	55,005	.....	.....	55,005	4,968	50,037	—4,968	10.6	10.1	0.2
Total United States	21,219,039	322,808	518,580	22,060,427	1,384,528	20,675,899	—543,140	15.2	14.9	...

finding of the deep pay at K.M.A.

Deep pays in East Texas, Louisiana, and Arkansas added to scattered finds in the center of the region are adding considerably to reserves. There is some eastward extension of the producing area in Arkansas as well. In Oklahoma good fields are occasionally opened up in the sharply folded southern part of the state. This area can be expected to produce much more. Elsewhere in Oklahoma, discoveries are largely confined to small structures with not particularly good production records. The extension of major fields in Kansas is still continuing and there is growing evidence of more production around the producing area on the north, west, and south. These may soon blossom out into major importance.

Two recent hot spots, the Forest City basin and Mississippi have cooled off almost completely. Illinois is definitely in the small-pool stage of discovery and Michigan is the only eastern state in which production is still being pushed out, in this case to the northwest of the old area.

Deep-Sand Possibilities

In recent years much additional oil has been added as a result of deeper drilling and there has developed a rather comforting idea to the effect that the possibilities in this regard are almost unlimited. Many areas, however, are now drilled not only to the lowest known pay but to the lowest possible producing horizon. Even where drilling depths are limited only by drilling equipment now in use, possibilities are far from limitless.

In the eastern states, no production of consequence has been obtained from below the top of the Trenton and this formation has not yielded much east of the Cincinnati arch. Farther east, the lowest pays rise in the section, to the Clinton in eastern Ohio and the Devonian in Pennsylvania and West Virginia. Past experience has indicated that these lowest horizons yield gas rather than oil. Michigan has no important Silurian or Ordovician production but these formations have not yet been thoroughly tested. The Illinois basin has Trenton production on the west flank as well as a little on the east. There is no reason why Trenton oil should not be found in the deeper part of the basin as well. Thus, east of the Mississippi, the Illinois and Michigan basins offer some opportunity for production within a few thousand feet of present levels.

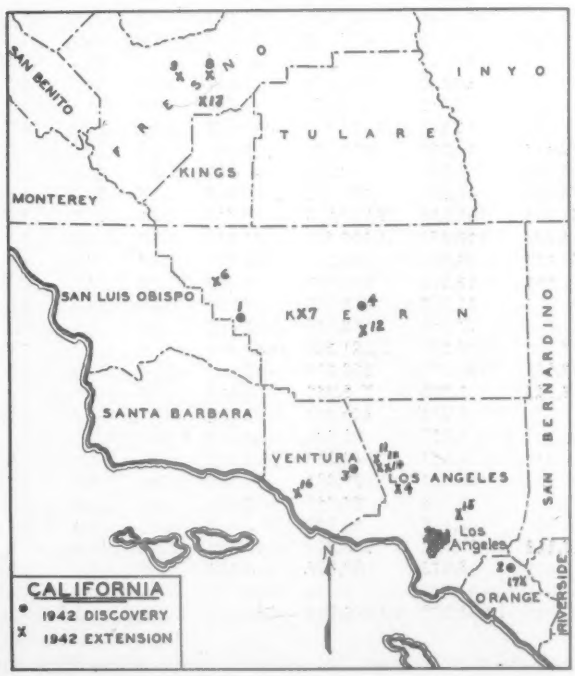
Oklahoma is now generally tested to the Arbuckle and no production has been found in the Cambrian as yet. In Kansas, there is some Cambrian sand production so that the possibility exists that it may be widespread through the Mid-Continent. It is also reported in Pecos County, Texas. There is thus one untested potential reservoir in a part of the Mid-Continent area. In North Texas and West Texas, Ellenburger possibilities are of prime importance and the Simpson sands are also good producers. The East Texas basin and neighboring parts of Arkansas and Louisiana have larger areas untested to known lower Cretaceous and Jurassic pays and there are even deeper possibilities.

On the Gulf Coast, temperatures limit drilling as the deeper pays tend to carry distillate and at even greater depths the temperature may be too great to permit drilling. The same condition prevails in California, although the distillate fields are as yet untapped except at Paloma. Deep drilling in the Rocky Mountain area has found much Tensleep and Embar production with the whole of the Paleozoic offering virgin territory below.

The total of the possible untapped reservoirs underlying known pays offers little hope that the reserves which they contain will be more than a small fraction of those in the known pays, except possibly in the Permian basin of West Texas and New Mexico and in the Rocky Mountain states. New productive areas must be opened on a large scale if the nation is to have adequate reserves in the near future.

Where these new productive areas will be found is anybody's guess. However, West Texas was the last of any major size and there has been a lot of searching for others in the past 20 years. It may be that the American oil industry is entering on a period of increased emphasis on secondary recovery as well as the development of substitute sources of oil.

DISCOVERIES AND EXTENSIONS BY DISTRICTS



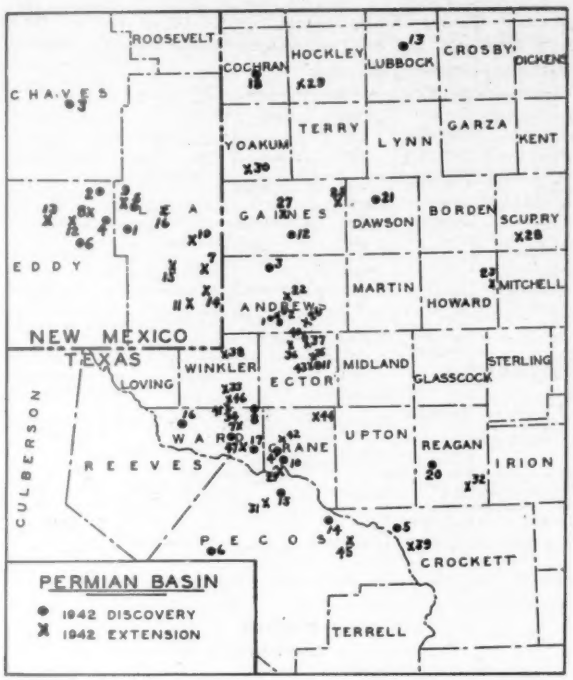
CALIFORNIA

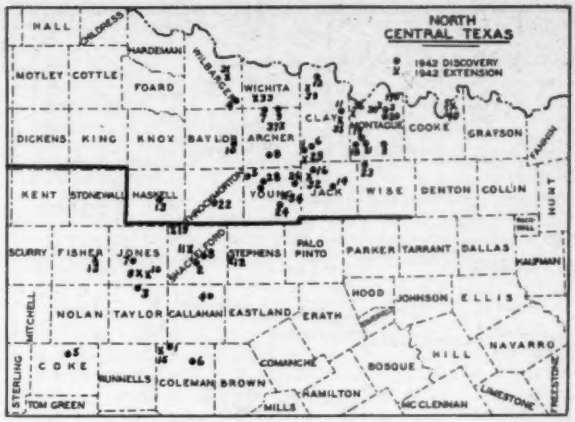
Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Antelope Plains, Kern; Temblor	320	50-80	7,500
(2) Buena Park, Orange; Pico	80	12-20	100
(3) Ramona anticline, Ventura; Modelo	40	560	250
(4) East Strand, Kern; Stevens	40	100	5,000
Total			12,850

Extensions

(5) Aliso Canyon, Los Angeles; Modelo	300	500	15,000
(6) Belridge, South, Kern; Etchegoin	160	50-150	1,000
(7) Elk Hills, Kern; Stevens	250	180	25,000
(8) Helm, Fresno; (three pays)	400	25-75	5,000
(9) Jacalitos, Fresno; Temblor	160	30	500
(10) Newhall Potrero, Los Angeles; Modelo	450	100-150	15,000
(11) Oak Canyon, Los Angeles; Modelo	160	75-150	2,500
(12) Paloma, Kern; Stevens	160	43	1,500
(13) Riverdale, Fresno; Temblor	160	20-50	2,000
(14) San Martinez, Los Angeles; Pliocene-Miocene	160	50-150	1,500
(15) Turnbull Canyon, Los Angeles; Sycamore Canyon	100	50-130	250
(16) Ventura Avenue, Ventura; Hisey	160	950	5,000
(17) Yorba Linda, Orange; Yorba Linda	200	50-175	5,000
Total			79,500





WEST TEXAS

Discoveries

Field and county; producing formation—	Acreage proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Embar, Andrews; Tubb	320	38	960
Ellenburger	380	180	3,220
(2) Mascho, Andrews; Permian	320	60	1,440
(3) Fullerton, Andrews; Clear Fork	640	24	4,320
(4) South Sand Hills, Crane; Permian	880	53	6,600
(5) Sun-Shannon, Crockett, White Horse	80	120	400
(6) Chancellor, Pecos; Delaware	80	20	400
(7) Byrd, Ward; Permian	160	56	480
(8) Monahans, Ward; Tubb	40	10	320
Ellenburger	40	136	450
Miscellaneous*	..	..	2,164
Total			20,754

*(9) South, (10) McKee, (11) Midway, (12) Robertson, ((13) Stinnett, (14) Wentz, (15) Jamison-Pollard, (16) Pruitt, (17) South Shipley, (18) Bieg, (19) Sunray, (20) Big Lake-Blaine, (21) Welch.

Extensions

(22) West Fuhrman, Andrews; Permian	1,050	170	3,680
(23) Iatan, Howard; Clear Fork	640	116	2,560
(24) Abell, Pecos; Permian	320	30	2,240
Simpson	1,000	40	7,000
(25) Cedar Lake, Gaines, San Andres	720	60	3,600
(26) Emma, Andrews; San Andres	520	55	4,100
(27) Seminole, Gaines; San Andres	240	175	2,880
(28) Sharon Ridge, Mitchell and Scurry; Clear Fork and San Andres	400	20	1,200
(29) Slaughter, Cochran, Hockley and Terry; San Andres	10,500	75	67,250
(30) Wasson, Gaines, Yoakum; San Andres	3,200	250	17,600
(31) Apco-Warner, Pecos; Ellenburger	400	65	7,680
(32) Barnhart, Reagan; Ellenburger	1,280	275	16,140
(33) Emperor, Winkler; Yates	400	55	2,400
(34) Estes, Ward; Whitehorse	360	150	1,800
(35) Foster, Ector; San Andres	160	35	1,120
(36) Goldsmith, Ector; San Andres	840	60	6,720
(37) Johnson, Ector; San Andres	280	75	1,120
(38) Keystone-Colby; Whitehorse	1,400	170	5,600
(39) Noelke, Crockett; Yates	160	25	960
(40) North Cowden, Ector; San Andres	1,200	220	7,200
(41) North Ward, Ward and Winkler; Whitehorse	320	60	960

(Continued on Page 71)

NORTH TEXAS

Discoveries

Field and county; producing formation—	Acreage proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Watson, Clay; Caddo	320	30	2,560
(2) Forestburg, Montague; Marble Falls	320	31	2,880
(3) Sanders, Montague; conglomerate	80	11	720
(4) Potts-Ellenburger, Wilbarger; Ellenburger	80	7	720
(5) Padgitt, Young; Mississippi	120	80	1,080
(6) Joy, Clay; Mississippi	200	115	1,800
Miscellaneous*	1,430	..	3,810
Total			13,650

*(7) Cooper, (8) School-Cahoon, (9) Browning, (10) Rendham, (11) Spring, (12) Wilder, (13) Lawson, (14) Worsham-Steed, (15) Alma, (16) Post Oak-Boyd, (17) Illinois Bend, (18) Eanes, (19) Hildreth, (20) Mount View, (21) Ketchum, (22) Humble, (23) Park Springs, (24) Kisinger, (25) Garvey, (26) Talbot, (27) Daws, (28) Holbert.

Extensions

(29) Antelope, Clay; Mississippi	200	170	1,000
(30) Clingingsmith, Montague; Strawn	160	30	800
(31) Harold, Wilbarger; Cisco and Canyon	200	48	800
(32) Hoefle, Jack; Caddo lime	500	41	3,000
(33) K.M.A., Wichita; Strawn	600	20	1,800
Ellenburger	2,400	30	15,600
(34) Knox, Young	200	20	800
(35) New York City, Clay; Mississippi	200	85	1,500
(36) Ringgold, Montague; Bend	320	15	1,120
(37) Scotland, Archer; Caddo and Strawn	280	15	980
(38) Ross, Clay; Caddo lime	320	65	1,920
(39) Thornberry, Clay and Wichita; Pennsylvanian	400	15	800
(40) Walnut Bend, Cooke; Strawn	320	15	960
(41) Watson, Clay; Mississippi	480	35	1,800
Miscellaneous, Archer County	1,000	..	2,500
Miscellaneous, Young County	320	..	960
Miscellaneous Jack, Clay, Cooke, Montague, Throckmorton, Wichita and Wilbarger counties	800	..	2,000
Total			38,340

WEST CENTRAL TEXAS

Discoveries

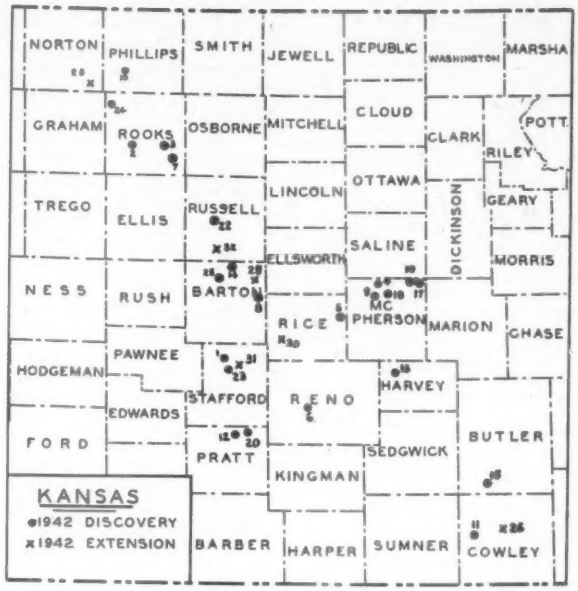
(1) Coker, Coleman; Morris	20	80	700
(2) Elliott, Shackelford; Strawn	26	160	450
(3) Reddin, Taylor; lower Hope	5	160	640
Miscellaneous*	....	....	590
Total			2,380

*(4) Putnam, (5) Blackwell, (6) Huffman, (7) Grogan, (8) Poor Farm.

Extensions

(9) Wimberly, Jones; Gunsight	1,000	12	4,000
Miscellaneous*	....	....	2,020
Total			6,020

(10) Akard, (11) Cook, (12) Loving, (13) McCaulley, (14) Nail, (15) North Novice.



OKLAHOMA

Discoveries

Field and county; producing formation—	Acreage proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Hickory Grove, Creek; Bartlesville	40	10	160
(2) West Navina, Logan; Layton	240	33	960
(3) Markham, Payne; Burgess	40	8	120
(4) Brooksville, Pottawatomie; Hunton	400	40	1,200
(5) Midwest, Okfuskee; Hunton	40	5	120
(6) Pauls Valley, Garvin; Wilcox	520	25	32,800
(7) Centerpoint, Pottawatomie; Simpson	200	20	1,200
(8) East Watchorn, Pawnee; Wilcox	500	17	5,000
(9) Liberty, Noble; Wilcox	120	6	480
(10) Northeast Lucien, Noble; Wilcox	200	14	1,600
(11) McComb, Pottawatomie; Hunton	40	50	120
(12) Romulus townsite, Pottawatomie; Hunton	40	47	120
(13) Ardmore, Carter; Springer	120	22	720
(14) Roper, Pontotoc; Viola	40	47	120
(15) Guthrie townsite, Logan; Simpson	160	56	1,200
(16) East Liberty, Noble; Wilcox	40	11	120
(17) Caddo deep, Carter; Simpson	40	2	240
(18) Northeast Edmond, Oklahoma; Wilcox	160	28	640
Miscellaneous counties: Lincoln, Seminole, Okfuskee, Payne, Creek, Noble, Kay, Logan, Comanche, Hughes, Marshall, Pawnee, Pottawatomie	680	....	1,940
Total			48,860

Extensions

(19) Cumberland, Marshall; sand	40	....	320
(20) Edmond, Oklahoma; Wilcox	40	10	240
(21) Sylvan, Seminole; Cromwell	240	15	960
(22) Hotulke-West Earlsboro, Pottawatomie; Earlsboro	320	5	2,400
(23) Jesse, Coal; Hunton	80	11	240
(24) Velma, Stephens; sandy lime	80	170	320
(25) Hazel, Seminole; Hunton	40	33	120
Miscellaneous	400	....	2,000
Total			6,600

KANSAS

Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Hazel, Stafford; Arbuckle	80	11	480
(2) Barry, Rooks; Arbuckle	40	25	160
(3) Dorr, Rooks; Lansing	40	11	160
(4) Lindsborg, McPherson; Simpson	600	12	3,600
(5) Smyres, Rice; chat	400	15	2,400
(6) Merten, Reno; Lamotte	120	29	480
(7) Baum, Rooks; Lansing	80	....	320
(8) Breford, Southwest, Barton; Arbuckle	40	13	160
(9) Lindsborg, South, McPherson; Viola	40	8	320
(10) Dayton, South, Phillips; Lansing	200	50	1,200
(11) Henderson, Cowley; Lansing	40	10	120
(12) Iuka, West, Pratt; Simpson	160	10	640
(13) Iuka, East, Pratt; Simpson	160	10	640
(14) Beaver, Northwest, Barton; Lansing	40	40	120
(15) Dunn's Mill, Butler; Arbuckle	120	10	720
(16) Stucky, Harvey; chat	80	19	480
(17) Crowther, McPherson; chat	40	23	240
(18) Lindsborg, Southwest, McPherson; Viola	120	5	720
(19) Roxbury, South, McPherson; chat	120	16	720
(20) Carm, Pratt; Arbuckle	40	10	240
(21) Pioneer, Rice; Arbuckle	40	10	240
(22) Russell, North, Russell; Lansing	80	50	480
(23) Curtis, Stafford; Arbuckle	80	10	480
(24) Ray, Southeast, Rooks; Lamotte	40	15	320
(25) Ainsworth, Barton; Lansing	40	40	160
Total			15,600

Extensions

(26) Frog Hollow, East, Cowley; Bartlesville	80	10	480
(27) Stickney, Barton; Arbuckle	120	10	720
(28) Ray, Norton; Lamotte	40	8	240
(29) Kraft-Prusa, Barton; sand	80	10	800
(30) Raymond, Rice; Lansing	80	23	800
(31) Drach, Stafford; Arbuckle	120	10	720
(32) Trapp, Russell; Arbuckle	240	10	2,400
Miscellaneous counties: Reno, Rice, Barton, Ellis, McPherson, Pratt, Rooks, Russell, Stafford	4,000	....	30,000
Total			36,160

COLORADO

Extensions

(1) Wilson Creek, Rio Blanco; Morrison	440	125	4,000

UPPER TEXAS GULF COAST

Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Buck Snag, Colorado; Yegua	40	15	300
(2) Camp Eleven, Tyler; Wilcox	100	10	1,500
(3) Harman, Jackson, Frio	600	8	3,000
(4) Mercy, San Jacinto; Wilcox	300	6	2,000
(5) Mayo, Jackson; Frio	1,400	10	7,000
(6) Mustag Creek, Jackson; Frio	100	4	500
(7) North Bay City, Matagorda; Frio	300	8	1,500
(8) Orange Hill, Austin, Wilcox	300	15	1,500
(9) Sealy, Austin; Wilcox	40	24	200
(10) South Aldine, Harris; 7,200 ft.	120	8	250
(11) Stewart, Jackson; Frio	800	15	4,000
(12) West Mauritz, Jackson; Frio	600	15	3,000
(13) Livingston, Polk, Sparta-Wilcox	800	34	5,000
(14) Lake Creek, Montgomery; Wilcox	200	40	1,200
(15) Danbury	60	50	900
Total			31,850

Extensions

(16) Old Ocean, Brazoria	15,000
(17) Withers-Magnet, Wharton	21,500
Miscellaneous	15,000
Total	51,500

LOWER TEXAS GULF COAST

Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) La Gloria, Jim Wells; 3 sands	400	85	3,000
(2) Koopman, Jim Wells; 4,000 ft.	80	7	320
(3) South Caesar, Bee; Wilcox	600	10	6,000
Miscellaneous*			2,640
Total			11,960

*(4) Alamo, (5) Medio Creek, (6) Nordheim, (7) Pintas, (8) Quinto Creek, (9) Sarco, (10) Tynan, (11) Yorktown, (12) Rooke, (13) South Sinton.

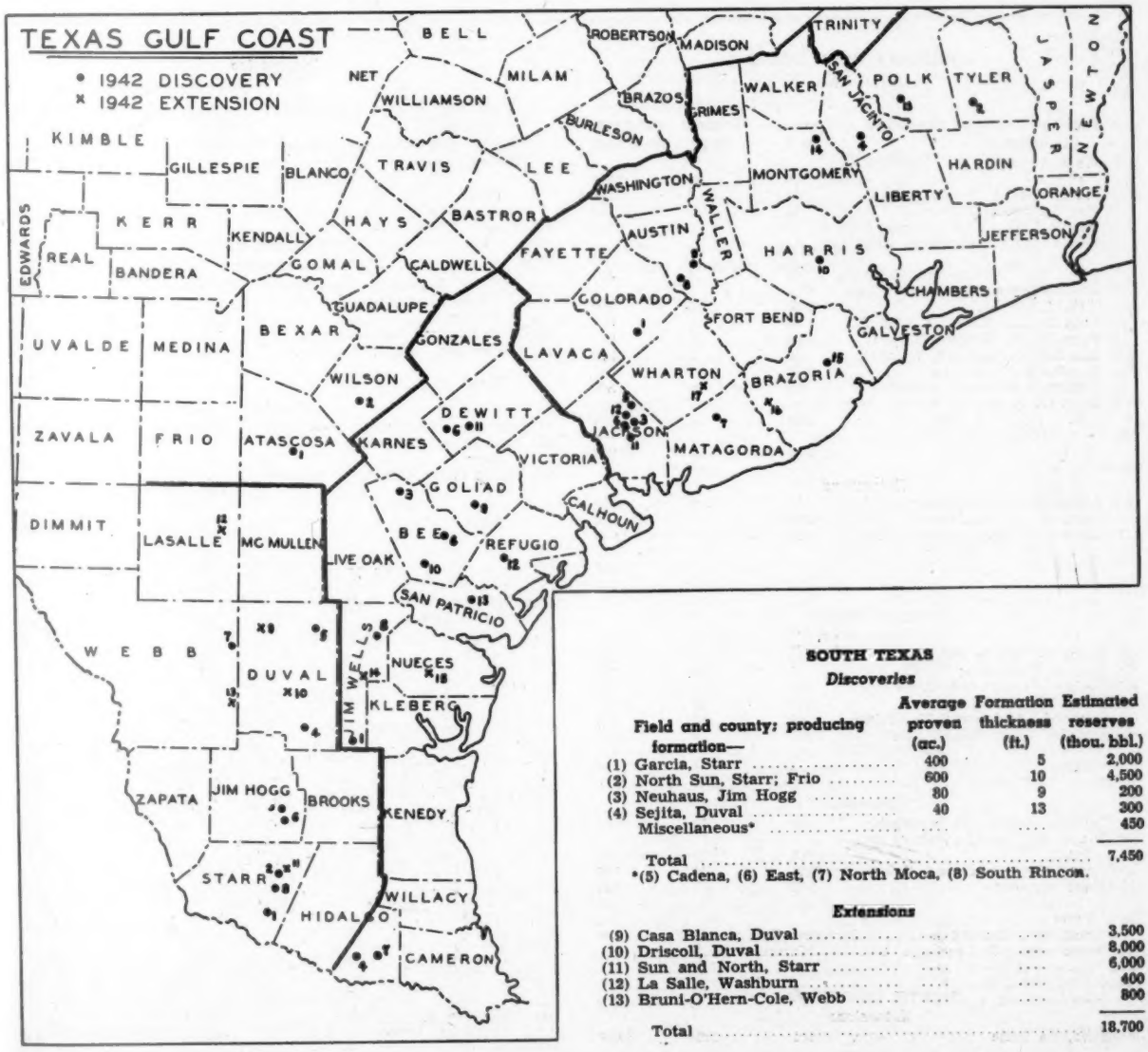
Extensions

(14) Ben Bolt, Jim Wells	4,000
(15) Minnie Bock, Nueces	8,000
Miscellaneous	10,000
Total	22,000

SOUTH CENTRAL TEXAS

Discoveries

(1) Imogene, Atascosa; Edwards	40	10	100
(2) Poth, Wilson	40	5	50
Total			150



SOUTH TEXAS

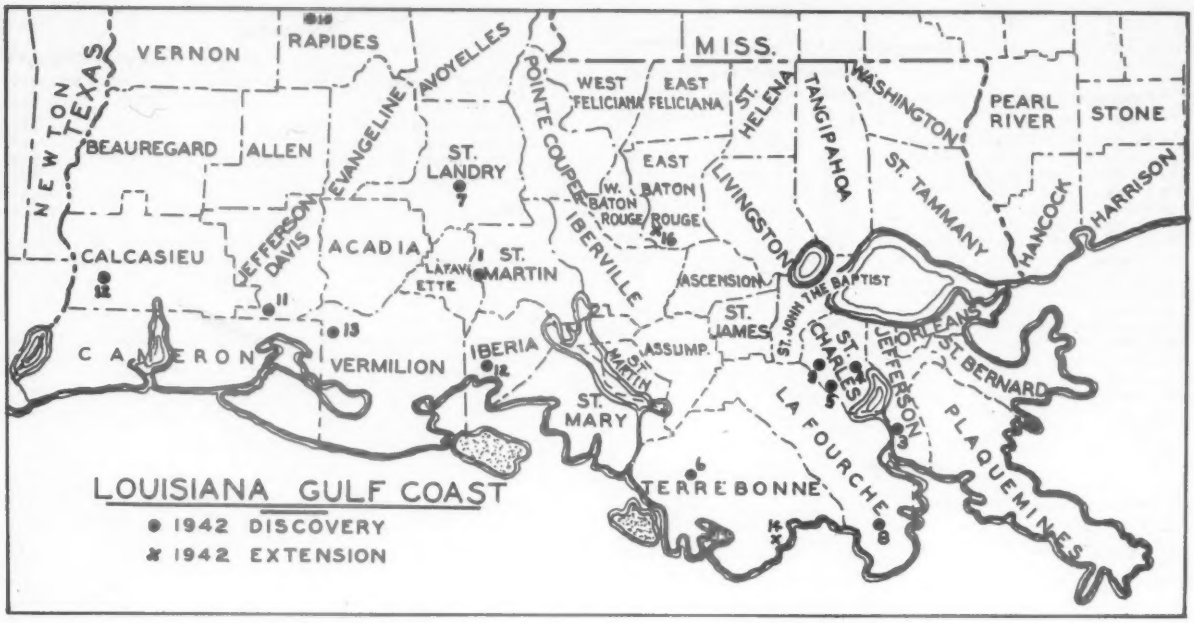
Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Garcia, Starr	400	5	2,000
(2) North Sun, Starr; Frio	600	10	4,500
(3) Neuhaus, Jim Hogg	80	9	200
(4) Sejita, Duval	40	13	300
Miscellaneous*			450
Total			7,450

*(5) Cadena, (6) East, (7) North Moca, (8) South Rincon.

Extensions

(9) Casa Blanca, Duval	3,500
(10) Driscoll, Duval	8,000
(11) Sun and North, Starr	6,000
(12) La Salle, Washburn	400
(13) Bruni-O'Hern-Cole, Webb	800
Total	18,700



LOUISIANA GULF COAST

Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Anse La Butte, St. Martin; 9,800 ft.	40	36	1,200
(2) Avery Island, Iberia; 9,000 ft.	360	7	3,000
(3) Bay de Chene, Jefferson; 7,500 ft.	40	30	1,200
(4) Bayou Couban, St. Charles, 6,500 ft.	40	9	1,200
(5) Bayou des Alemands, St. Charles, 5,425 ft.	40	14	250
(6) Jug Lake, Terrebonne, 10,200 ft.	100	5	400
(7) Krotz Springs, St. Landry, 9,300 ft.	80	10	800
(8) Leeville, La Fourche, 8,500 ft.	40	10	600
(9) Paradis, St. Charles, 11,000 ft.	200	28	1,600
(10) Big Island, Rapides; Wilcox	40	2	200
(11) Thornwell, Jefferson	40	12	300
(12) Vinton, Calcasieu; 4,900 ft.	60	6	300
(13) West Gueydan, Vermilion 11,000 ft.	100	12	1,000
Total			12,050

Extensions

(14) Lake Pelto, Terrebonne; 11,400 ft.	400	10	3,000
(15) Paradis, St. Charles	1,000	....	10,000
(16) University, East Baton Rouge	500	....	4,000
Total			17,000

EAST TEXAS

Discoveries

(1) Quitman, Wood; Paluxy	40	40	320
(2) Larissa, Cherokee; Pettit	40	38	200
(3) Weiland, Hunt; Woodbine	200	12	600
(4) Coke, Wood; Paluxy	1,000	28	5,500
(5) Concord, Anderson; Woodbine	40	20	160
(6) Kildare, Cass; Gloyd zone	400	17	1,900
Total			7,786

Extensions

(7) Cayuga, Anderson; Woodbine	120	18	1,900
(8) Chapel Hill, Smith; Paluxy and Pettit	1,000	20	4,800
(9) Long Lake, Anderson; Woodbine	300	10	750
Miscellaneous*	200	..	730
Total			7,280

*Includes following pools: (10 Pleasant Grove; (11) Flak Lake; (12) Pittsburg; (13) Carthage, and (14) Marion shallow.

NORTH LOUISIANA

Extensions

(6) Nebo, La Salle	600	300	6,000

Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Haynesville, Claiborne; Pettit	4,800	....	40,000
Miscellaneous*	....	....	2,000
Total			42,000

*(2) Calvin, (3) Catahoula Lake, (4) Indian Bayou, (5) Lake St. John.

ARKANSAS

Discoveries

(1) Midway, Lafayette; Smackover	2,000	30	18,000
(2) McKamie, Lafayette; Cotton Valley	40	30	360
(3) New London, Union; Frost	480	20	3,000
(4) Texarkana, Miller; Smackover	40	51	520
Total			21,880

Extensions

(5) Dorcheat, Columbia; Smackover	160	40	2,000
(6) Macedonia, Columbia; Smackover	160	75	2,000
(7) Mount Holly, Ouachita; Smackover	160	26	1,500
Total			5,500

ILLINOIS

Discoveries

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(1) Akin, Franklin; Cypress	120	10	750
(2) Beaver Creek, Bond; Bethel	80	....	435
(3) Bible Grove, Clay; McClosky, Cypress	1,280	12	2,024
(4) Concord, White; Aux Vases	40	....	200
(5) Coil, Wayne; Aux Vases	520	8	1,275
(6) Covington, Wayne; McClosky, Aux Vases, Levias	1,280	33	8,081
(7) East Dundas, Richland; McClosky	440	7	700
(8) Friendsville, Wabash; Bethel	240	6	552
(9) King, Jefferson; Aux Vases, Levias, McClosky	200	36	1,150
(10) Markham City, Jefferson; Levias, McClosky	480	13	1,164
(11) North Carmi, White; Aux Vases	120	11	600
(12) North Sims, Wayne; McClosky, Rosiclare	240	21	445
(13) St. Jacob, Madison; Trenton	920	33	1,247
(14) Sesser, Franklin; Aux Vases	120	9	650
(15) South Johnsonville, Wayne, McClosky	80	....	335
(16) South Sailor Springs, Clay; Weiler	160	11	250
(17) West Inman, Gallatin; Weiler	200	12	600
(18) West Jeff, Wayne; Aux Vases	80	....	300
(19) Blairsville, Hamilton; Aux Vases, McClosky	400	31	1,500
(20) Aden, Wayne; McClosky	180	14	750
(21) Boulder, Clinton; Devonian	1,040	22	3,000
(22) East Centerville, White; Bethel	1,200	13	625
(23) East Inman, Gallatin; Waltersburg, Palestine, Clore	2,400	32	1,500
(24) Grayville, White; Biehl	120	8	350
(25) Irvington, Washington; Weiler	1,640	22	500
(26) Jeff, Wayne; Aux Vases, McClosky	640	16	1,750
(27) Maunie, White; Permian sand, Aux Vases, Tar Springs	280	29	800
(28) Mount Erie, Wayne; Aux Vases	440	18	775
(29) North Benton, Franklin; Paint Creek	440	22	100
(30) North Boos, Jasper; Rosiclare	2,320	6	600
(31) Parkersburg, Richland; Paint Creek, Weiler	1,440	9	450
(32) Phillipstown, White; Palestine, Clore	1,460	12	875
(33) Rural Hill, Hamilton; Cypress	2,400	4	500
(34) Sims, Wayne; Levias	2,200	3	250
(35) South Maunie, White; Degonia	2,480	6	100
(36) Stokes, White; Aux Vases	1,120	9	650
(37) Walpole, Hamilton; Tar Springs	1,600	8	900
(38) Woodlawn, Jefferson; Weiler	800	8	325
Miscellaneous	....	....	910
Total			37,968

Extensions

Field and county; producing formation—	Average proven (ac.)	Formation thickness (ft.)	Estimated reserves (thou. bbl.)
(39) Rural Hill, Hamilton	1,200	....	1,500
(40) East Centerville, White	640	....	500
(41) Bone Gap, Edwards	880	....	750
(42) Roland, White	870	....	1,000
(43) South Mason, Effingham	320	....	500
(44) East Inman, Gallatin	800	....	1,250
Miscellaneous	....	....	1,560
Total			7,060

INDIANA

Discoveries

(1) Dodds Bridge, Sullivan; Devonian	240	42	750
(2) East Lamott, Posey; McClosky	80	9	100
(3) Somerville, Gibson; Tar Springs	80	20	125
Miscellaneous	....	....	800
Total			1,775

MICHIGAN

Discoveries

(1) Aetna, Missaukee; Dundee	120	....	750
(2) Evart, Osceola; Dundee	200	....	1,800
(3) Fork, Mecosta; Dundee	80	....	400
(4) Riverside, Missaukee; Dundee	40	....	10
(5) Sauble, Lake; Traverse	80	....	200
Miscellaneous	....	....	425
Total			3,585

Extensions

(6) Reed City, Osceola	600	....	3,600
(7) Winterfield, Clare	100	....	600
(8) Headquarters, Roscommon	600	....	3,600
(9) Richfield, Clare	160	....	480
Total			8,280

MONTANA

Discoveries

(1) Twin Rivers, Glacier; Madison	40	80	200

WYOMING

(1) Horse Creek, Laramie; Lakota	40	64	200
(2) North Hiawatha, Sweetwater; Wasatch	40	18	80
(3) Pilot Butte, Fremont: Tensleep	160	140	1,600
Embar	40	60	200
(4) Elk Basin, Park; Tensleep	40	44	400
(5) Cody, (Shoshone) Park; Tensleep	40	140	200

Extensions

(6) Circle Ridge, Fremont; Embar-Tensleep	80	130	400
(7) Mahoney, Carbon; Tensleep	80	118	400
(8) Wertz, Carbon-Sweetwater; Tensleep	120	330	3,000

WEST TEXAS (Continued)

(Continued from Page 67)

(42) Sand Hills Ordo., Crane; Ellenburger	400	80	4,800
Sand Hills Permian; Clear Fork	880	150	6,600
(43) South Cowden, Ector; San Andres	200	220	1,000
(44) Waddell, Crane; San Andres	400	138	4,800
(45) Walker, Pecos; Whitehorse	1,000	40	3,500
(46) Weiner, Winkler; Whitehorse	760	20	3,200
(47) Shipley, Ward; Yates	280	50	1,680
Total			189,390

SOUTHEAST NEW MEXICO

Discoveries

1() East Lusk, Lea; Permian	280	11	1,280
(2) Square Lake, Eddy; Whitehorse	4,500	15	20,000
Miscellaneous*	....	....	480
Total			21,760

*(3) Brown, (4) Culwin, (5) Philmex, (6) Wills.

Extensions

(7) Arrowhead, Lea; Whitehorse	320	60	1,280
(8) Jackson-Grayburg, Eddy; Whitehorse	1,100	40	4,400
(9) Maljamar, Lea; Whitehorse-Queen	900	40	3,600
(10) Monument, Lea; Grayburg	200	90	1,500
Miscellaneous*	....	....	6,800
Total			17,580

*(11) Cooper, (12) Loco Hills, (13) Red Lake, (14) Skelly, (15) West Eunice, (16) Vacuum and other minor extensions.

WARTIME Regulations Sharply Reduce Drilling Operations During 1942

by W. V. Howard

Exclusive of service wells, there were 18,150 wells drilled in the United States during 1942, a decline from the previous year of 11,746 wells. Prospects are that there will be a small drop in drilling during 1943.

DURING 1942 drilling operations were reduced 40 per cent from 1941. Excluding recompletions and service wells, there were 18,150 completions against 29,896 in the previous year. Two explanations are generally offered for this decline, namely M-68 and the unsatisfactory price structure. There is, however, a third factor which must be considered, namely, that even without the requirement of 40-acre spacing, combined with a shortage of labor and equipment, and with an increase in price there still might not have been 30,000 wells drilled in 1942. There were not that number of locations available. This is indicated by the fact that in certain areas where the 40-acre provision of M-68 was set aside to permit 20-acre and even 10-acre spacing, the decline in drilling was as great as in other areas. On the other hand, the 40-acre spacing rule did not affect some areas, such as West Texas, greatly because that spacing was normal in many fields. Yet there was a decided drop in drilling activity there also.

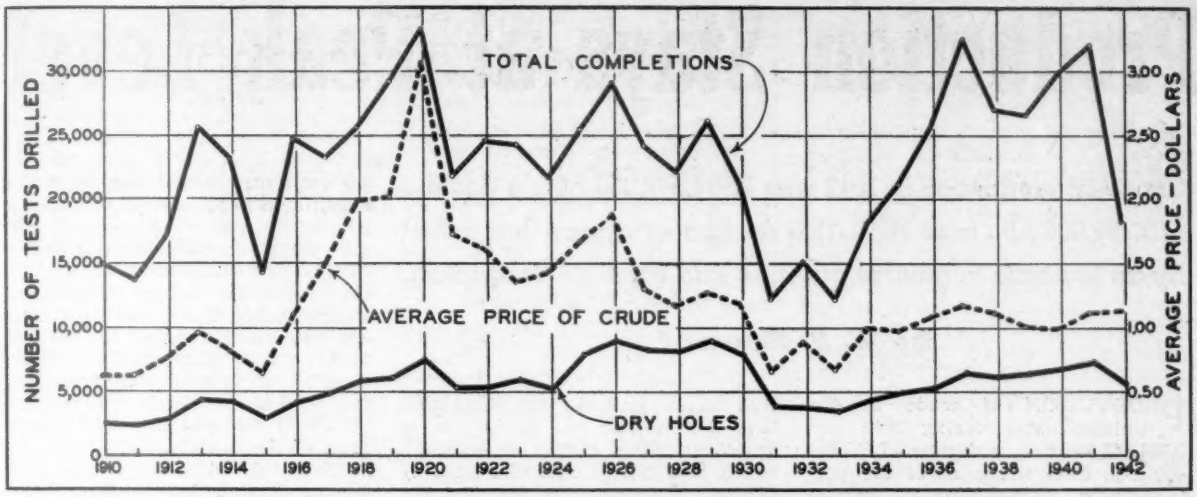
That price is a decided factor is readily determinable from the record. Drilling in the eastern fields declined 40 per cent in spite of small price increases and in spite of the encouragement given to producers in that area. The return from the investment required to drill wells with rising labor and equipment costs is not sufficient to permit extension of the Bradford floods or the development of the small gas wells of Kentucky. The demand for Pennsylvania Grade crude is great and the need for natural gas in the industrial East is pressing. The supply at present prices is inadequate to meet that demand. Under normal circumstances prices would rise until enough demand fell off so that the demand at the higher price would balance the increased supply available at that price. Some government agencies contend that an increase should not be applied to wells now drilled but only to wildcats. Obviously that increase would have to be in the form of a bonus or subsidy as the products of a successful wildcat cannot be segregated and sold at higher prices. On the contrary, most companies combine their wildcatting accounts with their general accounts for the simple reason that the drilling of wildcat wells is never profitable over a period of years and the fund for wildcatting must come from profits on production. Profit from wildcatting comes from the production yielded by other wells drilled in the fields discovered by the wildcats. This development is seriously hampered by both the spacing rules and the price situation.

Except for the new Burbank field in Kentucky, wells in that state, together with most of Ohio and West Virginia and all of New York and Pennsylvania are small producers so that the return from drilling at today's costs are generally unprofitable. Many operators in those states consider

Summary of Completed Wells in All Fields

	Oil	Gas	Dry	Total	Aver. footage	1941 total
Eastern	2,525	820	227	3,572	1,938	4,046
Ohio	232	513	400	1,145	2,511	1,653
Indiana	141	26	220	387	1,902	513
Kentucky	59	148	53	260	1,604	706
Michigan	293	70	300	663	2,523	949
Illinois	1,169	14	846	2,029	2,478	3,838
Mississippi	20	0	51	71	5,307	282
Alabama	0	0	4	4	1,449	9
Florida, Georgia	0	0	4	4	1,539	2
Kansas	815	80	624	1,519	3,341	2,112
Nebraska	10	0	27	37	2,449	94
Missouri, Iowa	0	0	13	13	1,805	28
Oklahoma	524	86	549	1,159	3,394	2,110
N. Central Texas	533	24	445	1,002	3,028	2,835
Eastern Texas	239	16	148	403	5,078	1,058
West Texas	1,065	10	180	1,255	4,330	2,297
Texas Panhandle	258	58	12	328	3,089	718
Southwest Texas	509	40	477	1,026	4,909	1,841
Texas Gulf Coast	437	38	199	674	6,541	1,078
La. Gulf Coast	286	6	142	434	8,877	872
North Louisiana	272	20	153	445	4,105	792
Arkansas	103	7	74	184	5,996	198
Montana	123	69	26	218	2,010	283
Wyoming	93	6	20	119	3,639	161
Colorado, Utah	10	1	14	25	4,921	33
New Mexico	251	12	83	346	3,319	277
California	556	25	247	828	4,056	1,111
Total: 1942	10,523	2,089	5,538	18,150	3,158	
1941	19,761	3,014	7,121	29,896	3,189	
Difference	9,238	925	1,583	11,746	31	
Total: 1941	*22,005	3,014	7,121	32,140	3,065	
1940	*21,103	2,300	6,637	30,040	3,049	
1939	*18,453	2,031	6,355	26,839		
1938	*19,121	1,985	6,043	27,149		
1937	*23,600	2,540	6,420	32,560		
1936	*18,525	2,068	5,295	25,888		
1935	*15,108	1,401	4,911	21,420		

*Includes input wells in eastern fields.



Relationship between total completions and dry holes with the average price of crude

that drilling operations have been unprofitable for some years but have kept at it because of lease requirements and the hope of a rise in price.

In the other eastern states, Illinois, Michigan and Indiana, the initial returns from new wells are generally higher and the lack of locations on which to drill becomes more noticeable. The situation in Illinois is complicated by the fact that many wells can produce from several horizons, none of which would pay out alone but which, taken together, yield good returns on the investment. Multiple completions in these pays have come to be standard in many fields. However, the maximum depths at which 10 and 20-acre spacing is permitted often finds one or more pays below those depths so that wells started on the closer spacing are not permitted to go to the deeper pays without special rulings. Also, some of the pays are limes and lime pays are specifically excluded from the amendment to M-68 permitting closer than 40-acre spacing. In the face of declining production east of the Mississippi, the need for multiple completions in Illinois and the fact that the exclusion of lime pays is based on a theory which does not apply to Illinois lime pays, many operators feel that only good could result from the revocation of all spacing limitations in Illinois.

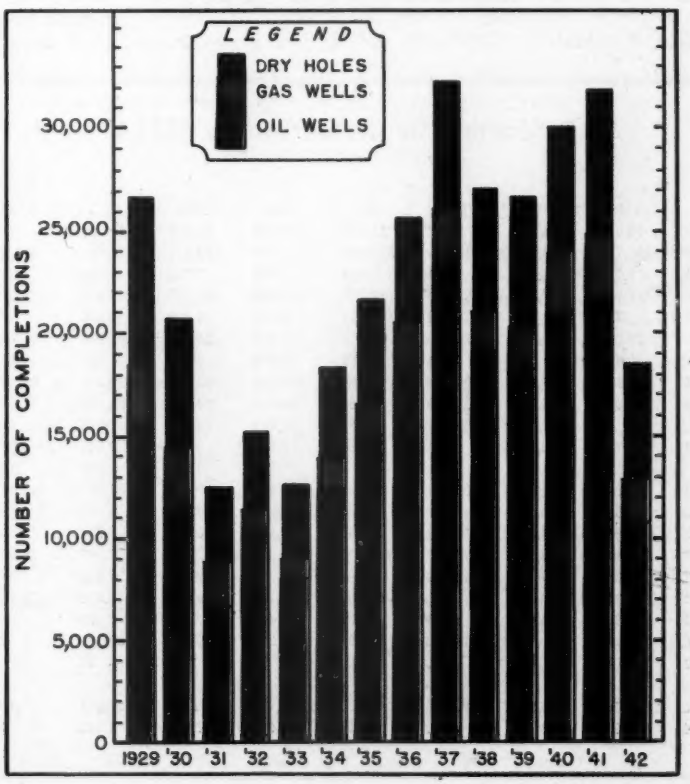
In Michigan, drilling declined less than in the rest of the country because of the development drilling in Reed City, Winterfield, Headquarters and other fields.

Mid-Continent

Kansas was relatively more active than any other area because of a number of new fields and extension of old ones. Peace Creek and Lindsborg were active all year and many extensions were reported from older fields, chief of which was the merging of several smaller pools into the Kraft-Prusa field. Trapp, Ainsworth and other fields were also extended and one well in the center of the Hall-Gurney, Gorham and Big Creek triangle may indicate the eventual merging of these fields. Scattered discoveries in Barber, Pratt, Rooks and Phillips counties indicate further development drilling and wildcatting in these edge areas.

The Forest City area saw a considerable decline during the past year and there is nothing to indicate an upturn in activity in the near future. In Oklahoma, drilling dropped nearly 50 per cent and here, too, there is not much hope for additional drilling.

Oil wells, gas wells, and dry holes drilled in the United States between 1929 and 1942



The section extending from the Permian basin to the Mississippi River contains many of the most promising sectors in the country, but its 1942 drilling record was comparatively poor. During the year Square Lake in New Mexico and Slaughter in West Texas kept busy and there are enough undrilled locations in Andrews County to keep West Texas in the limelight for another year or more. Many of the large West Texas fields keep a few rigs running and there is much wildcat territory which will keep activity up. In North Central Texas wildcatting also continues with a large number of discoveries. These are,

(Continued on P. 75)

Production Stays at Peak Level

Crude-oil production in 1942 was 1,384,542,000 bbl., a decline of 3,793,000 bbl. from 1941. This decline was more than offset by an increase in natural gasoline and distillate production.

by W. V. Howard

PRODUCTION of crude in the United States during 1942 was 1,384,542,000 bbl., a decline of 7,378,000 bbl. from the peak of the previous year. This decline amounts to a daily average of 20,000 bbl. In 1942 the six leading states, Texas, California, Oklahoma, Louisiana, Illinois and Kansas contributed 1,187,513,000 bbl., or 85.8 per cent of the total. In 1941 the same states produced 1,212,915,000 bbl. or 87.1 per cent of the total. This suggests that the nation is becoming less dependent on the largest producing areas and that other states are coming more into the limelight as important producers of oil. Closer analysis shows that of the six leading states, two, Louisiana and Kansas recorded their peak production in 1942 while a third, California, came close to its 1938 high and was apparently heading for its all-time high of 292,534,000 bbl. which was reached in 1929.

Thus the statistical table, if considered alone, leads to the conclusion that the nation's oil production is becoming more evenly distributed, which is a highly desirable state of affairs. However, two factors are omitted from the production report which must be considered with it, namely the quantity of immediately available oil and the transportation situation.

In 1942, tanker transportation to the Atlantic Coast from Texas and Louisiana ports were cut down sharply and the East Coast markets had to be supplied overland. This necessitated drawing heavily on the states nearest the market and restricting the output of those which are more remote to the capacity of the disturbed transportation system. Of the largest producing states, Illinois, Oklahoma and Kansas were favorably located in the eastern area and California was compelled to supply the Pacific markets.

California did so but grave fears are expressed concerning its ability to continue to produce at present levels despite a growing demand. Illinois' decline in production of 22,268,000 bbl. and Oklahoma's drop of 16,406,000 bbl. in the face of heavy demands plainly shows that the eastern market must be supplied in 1942 from farther afield. Kansas can supply still more oil but it is doubtful whether it can duplicate its rise in production of 14,980,000 bbl. and this will fall far short of the drop in the other states in District 2. Oklahoma's daily average production has dropped 65,000 bbl. during the year, while Illinois is now producing 140,000 bbl. fewer daily than at the start of the year. Kansas' rise in daily average production was 46,000 bbl. during the year.

Available Supply

This throws an added burden on Texas and Louisiana among the major producers and on the smaller producing states. Transportation facilities must be provided for these states in addition to the recently completed 24-in. line if the large available reserves are to be tapped. New Mexico, whose production declined 6,567,000 bbl. in 1942, is in a position to add much production in 1943, if the oil can be moved and Arkansas recorded its highest rate of production since the flush days of Smackover to indicate

Production in United States, 1935-42

(In thousands of barrels)

	1935	1936	1937	1938	1939	1940	1941	1942	Difference	Producing wells 1-1-43	Dly. av. bbl. per well	Cumulative prod.
Arkansas	11,139	10,697	12,181	18,357	21,383	26,072	26,301	26,566	265	3,030	24.0	530,261
California	207,832	214,756	238,592	249,930	225,493	223,104	230,317	248,395	18,078	18,524	36.7	6,054,018
Colorado	1,556	1,613	1,578	1,324	1,415	1,412	1,734	2,309	575	166	38.2	43,310
Illinois	4,351	4,439	7,426	22,800	92,203	146,484	128,550	106,282	—22,268	30,660	9.5	930,081
Indiana	767	792	821	968	1,711	4,978	6,536	6,620	84	1,949	9.3	144,241
Kansas	53,364	57,084	69,158	58,135	60,973	64,832	81,899	96,879	14,980	20,551	12.9	1,174,101
Kentucky	5,324	5,638	5,497	5,834	5,621	5,188	4,811	4,607	—204	14,750	0.9	185,733
Louisiana	50,287	80,807	90,427	94,955	94,182	103,410	117,634	128,231	10,597	7,481	47.0	1,301,558
Michigan	15,790	11,977	16,411	19,139	23,563	19,733	16,325	21,537	5,212	3,232	18.3	182,223
Mississippi	.....	.....	.....	.....	107	4,400	16,324	27,545	11,221	373	202.3	47,656
Montana	4,367	5,799	5,799	4,825	5,853	6,583	7,344	8,045	701	2,189	10.1	97,287
Nebraska	.....	.....	.....	.....	2	276	1,713	1,353	—360	92	40.3	3,340
New Mexico	20,154	26,648	38,438	36,009	37,872	39,488	39,566	32,999	—6,567	3,889	23.2	344,873
New York	4,241	4,626	5,465	5,045	5,098	4,999	5,126	4,968	—158	20,950	0.6	139,566
Ohio	4,121	3,837	3,550	3,297	3,156	3,159	3,284	3,384	100	24,899	0.4	592,150
Oklahoma	182,597	200,881	223,107	169,307	152,400	149,629	153,167	136,761	—16,406	52,999	7.1	5,084,966
Pennsylvania	15,899	17,041	19,174	17,449	17,832	17,353	16,492	16,841	349	82,000	0.5	1,030,401
Texas	391,592	424,396	502,967	470,760	482,335	489,183	501,348	474,935	—26,413	98,652	13.2	7,636,000
West Virginia	3,959	3,814	3,829	3,725	3,580	3,444	3,378	3,492	114	17,750	0.5	420,405
Wyoming	13,238	14,269	19,637	18,956	21,207	26,232	30,009	32,736	2,727	1,860	48.2	571,187
Miscellaneous	43	48	60	60	94	71	62	57	5	120	1.3	1,224
Total	990,621	1,069,162	1,264,117	1,200,875	1,254,630	1,340,030	1,391,920	1,384,542	—7,378	406,144	9.3	26,514,584
Daily average	2,714	2,976	3,463	3,290	3,428	3,671	3,813	3,793	20	.....	.....	.....

that it is far from through as an important oil-producing state. Another state in this area to record an all-time peak was Mississippi. However, the year's production figure does not show that this high was reached through a rise from 72,000 to 99,000 bbl. daily in the early part of the year which was succeeded by a steady decline to 57,000 bbl. In other words, unless new fields are found quickly in Mississippi its 1943 production may be expected to fall below the 1941 figure and last year was a very poor year for Mississippi exploration.

Other eastern states are in fairly good condition. Indiana produced more oil last year than in any year since 1905 but the rise was small and the fields which caused it are now on the decline. Michigan also showed a good increase in production in 1942, owing to the development of several good fields but the flush has passed here also and Michigan must yield new important discoveries rapidly if 1943 is to match 1942.

The Rocky Mountain states are improving their position with Montana at its peak, Wyoming at the highest level since 1924 and Colorado nearing its high in the late twenties. However, this territory will be required to help out Canadian needs and may be called on to supply more oil to the Pacific Northwest so that it may experience an acute shortage in spite of a rising production trend.

Analysis of the production record of 1942 does not, therefore, lead to much optimism with respect to 1943 with many states apparently falling short of expected demands because of failing reserves and others which might take up the slack prevented from doing so by inadequate transportation facilities.

A discussion of major fields begins on page 171. Cumulative production from the nation's largest fields as well as their ultimate and future recoverable reserves are shown.

If, therefore, production is to continue at present levels, it will require expenditure of large amounts of money for drilling and revamping the transportation system. It will also require the concerted efforts of the best brains of the industry and the Government with a complete cessation of politics, a realization of the needs of the industry in labor and materials and satisfactory economic conditions.

Wartime Regulations Reduce Drilling

(Continued from Page 73)

however, small and none of them is followed by extensive activity. In East Texas prospecting for Pettit production will probably continue with more development in Wood County's new pools. Haynesville and Midway were the two most active sections of the North Louisiana-Arkansas sector, but these are now slowing down with no large new development in immediate prospect.

Gulf Coast

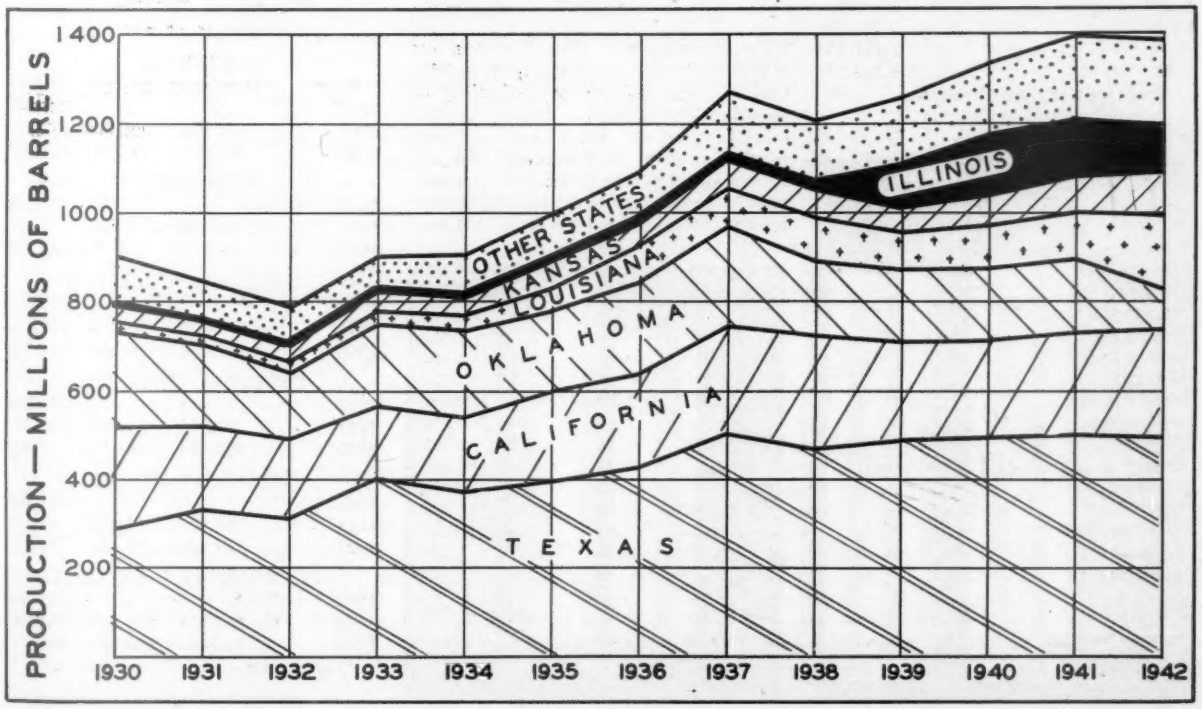
Drilling fell sharply in the coastal districts. In Mississippi, Tinsley is drilled up with no new development in sight. Many of the fields in Louisiana and coastal Texas are operated as units and, although many more wells could be drilled, better conditions, either of price or markets, are necessary to stimulate much activity here. The great depths of many pays in the eastern part of the area makes profitable exploitation risky, at present prices and with unstable markets.

Rockies and California

Drilling declined less in the Rocky Mountain states and California than elsewhere due to the increased demand for crude. Much drilling in California was in the old heavy-crude fields whose reserves were noticeably increased as a result. This drilling will undoubtedly continue through the year. It is significant that the average footage of wells drilled in California last year was 1,704 ft. less than in 1941 due to the renaissance of the shallow heavy-crude pays.

Considering the country as a whole, therefore, it seems that there are few areas in which there is much possibility for increased drilling in 1943 and unless there is some relief in price, restrictions on drilling, or markets due to the scrambled transportation system, prospects are that drilling in 1943 will not greatly exceed 16,000 wells.

Crude production in the United States 1930 to 1942, showing the proportion provided by the six states with the largest production



OIL DEMAND at NEW PEAK

by C. O. Willson

THE demand for petroleum liquids in the United States in 1943 will exceed that of any previous year. The record requirements will come despite a substantial reduction in gasoline consumption by civilians. The gains will be largely accounted for by the steadily expanding needs of this country's military machine, both within and outside its boundaries.

It is impossible to project the year's oil requirements as accurately as is done in peacetime. The Bureau of Mines has estimated that the domestic crude-oil demand the first quarter of this year will exceed the same period in 1942 by 4 per cent. The Petroleum Industry War Council, whose analyses have pointed to increased requirements this year over last year, has predicted that by the last quarter of this year demands for all oils will be 4,670,000 bbl. daily, a figure which is 400,000 bbl. daily, or about 9 per cent over the last quarter of 1942.

Just what the demand will be and the division as to products will depend largely on the course of the war. A more normal movement of petroleum later in the year through effective action against enemy submarines and the opening up of the Mediterranean through Allied control of North Africa would have a bearing on 1943 demands. It would permit a freer use of Allied oil supplies in the Persian Gulf area and also lift the severe restrictions in the movement of oil from the northern tier of South American countries and the Dutch West Indies. This would mean that these countries to the south would have a larger share of the petroleum war market than they have had in recent months. This expansion would be principally in the heavier products and would not affect the rapidly expanding shipments of aviation motor fuels and the other principal war products of petroleum from this country.

An easing in the coastwise movement of tankers would also bring a return to the more normal consumption of gasoline and other products by civilians and war industries in this country. The estimate of 1943 requirements at this time assumes a continuance of the drastic national rationing of gasoline and the more local but highly important restrictions in the consumption of other products.

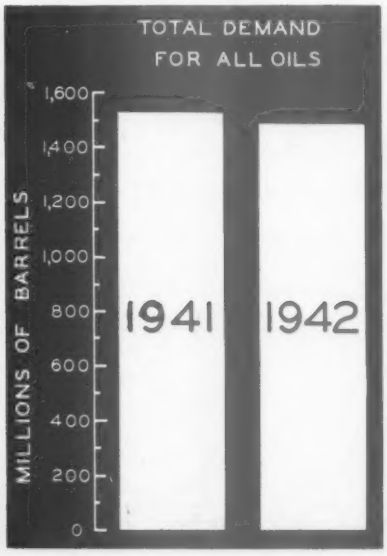
Gasoline

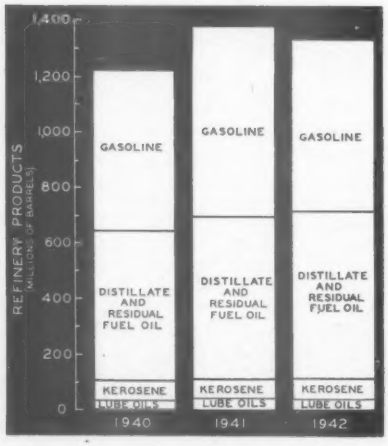
Developments in 1942 demands are reflected in the accompanying tables and charts. Voluntary rationing of gasoline by civilians began at the start of the year but available information reveals that demand did not materially decline until the summer months when enforced rationing was inaugurated in 17 eastern states and the District of Columbia and in Washington and Oregon as a result of the curtailment in coastwise tanker movements. Results in the eastern states indicate that under national rationing, which became effective December 1, 1942, domestic gasoline consumption in January and February will be from 20 to 25 per cent less than the same 2 months in 1942. Rationing seeks to reduce civilian use by 40 or more per cent but the increased consumption of trucks and buses, plus the military requirements in this country, reduce the total expected decrease to the figures of 20 to 25 per cent. The increased lend-lease and export shipments of gasoline, on which no reports are available, will further offset the decline in domestic requirements so that estimates of total needs for this year, assuming a continuance of present rationing, point to a demand which will not be greatly under the estimated 1942 shipments of 620,000,000 bbl., a decrease of only 9 per cent compared to 1941. It is worthy of note that in November the last complete report available, total gasoline demand at refineries and natural-gasoline plants in this country was only 5 per cent

CONSUMPTION OF ALL OILS
(Thousands of barrels)

Year—	Total*
1942 (estimated)	1,530,000
1941	1,580,000
1940	1,453,969
1939	1,417,537
1938	1,329,086

*Does not include benzol.





REFINERY PRODUCTS
(Thousands of barrels)

Year—	Domestic	Export	Total
GASOLINE			
1942*	.....	.....	620,000
1941	660,000	23,500	683,500
1940	589,490	25,377	614,867
KEROSENE			
1942*	.....	.....	71,500
1941	69,000	2,500	71,000
1940	68,776	3,374	72,150
DISTILLATE FUEL OIL			
1942*	.....	.....	210,000
1941	173,000	16,100	189,100
1940	160,851	19,140	179,991
RESIDUAL FUEL OIL			
1942*	.....	.....	390,000
1941	382,000	14,500	396,000
1940	340,163	16,109	356,272
LUBRICATING OIL			
1942*	.....	.....	38,000
1941	32,000	9,000	41,000
1940	24,690	10,461	35,151
PETROLEUM WAX (LB.)			
1942*	.....	.....	623,894
1941	548,904	204,357	753,261
1940	356,653	190,065	546,718

*Estimated.

under November 1941, and greater than in October 1942.

Burning Oils—Distillates

For the purpose of a general appraisal all burning oils and the distillate fuel oils and gas oils can be considered as one group of products. They are partially interchangeable in use as has been demonstrated many times in recent months in those areas where acute shortages have developed. War agencies have explained that civilian consumption of these products is more essential than that of gasoline and efforts at rationing have been solely due to the inability to transport all of the needed products from the points of production to consumers.

Despite the restrictions of 20 per cent or more in the use of these oils over a large part of the United States, the estimated 1942 demands exceeded the previous yearly record of 1941. While most of these important fractions of normal refinery operations are consumed as burning oil and heating oil, the demands as tractor fuel and diesel oil expanded rapidly last year with further increases assured for this year. Diesel power is a major factor in the expansion of the navies of the United Nations and it is also being widely used as power in all new shipping. There have been installations in industrial plants and in military camps. The impetus given diesel power by the war, involving greater care in the manufacture of products meeting new specifications, is certain to greatly widen the markets for diesel oils after the war.

In regard to civilian use projections of burning oil and light fuel oil demand at this time assume that the completion of the 24-in. line to the Atlantic seaboard and other expansion in pipe-line transportation will mean that it will not be necessary to curtail consumption as much the last half of 1943 as was done the last 6 months of 1942 and that in prospect for this quarter. For the entire year further expansion in demands are in prospect.

Practically all outlets for residual fuel oils have expanded in recent years, the growth culminating in the 40,000,000-bbl. gain in 1941. In 1942 there would have been further increases if the petroleum industry had been in a position to supply all of the demands. The policy has been to take care of the Navy's increasing needs first and war production requirements second, followed by essential utilities centering in the railroads and power plants. Other industries and buildings utilizing the low-gravity oils have been urged to use other fuels wherever possible and a substantial conversion has resulted.

This same policy will continue in 1943. The requirements of the Navy and general shipping will greatly increase and some further gains by war-production industries are in prospect. The extent of consumption by other industries and by civilians generally will be dependent largely on transportation conditions.

Normally the large production of residual fuel oils from refineries of the Dutch West Indies which obtain most of their crude oil from Venezuela and Colombia is a direct competitive factor in the domestic and foreign demands for fuel oil in this country. The fact that European requirements in recent months could be more conveniently supplied from ports in the United States brought a severe curtailment last year in the South American operations. It is predicted that greater protection for shipping will bring a return to a more normal movement of crude oil and products from South America and the West Indies and will absorb part of the increased war demand of the United Nations. There is a possibility that imports of heavy oils to this country will increase. At the start of the year, all estimates provide for increased production of the residual fuels at refineries and plant operations are being adjusted to meet these requirements.

Lubricating Oils

Manufacturers of lubricating oils during the latter part of 1942 were feeling the effects of gasoline rationing and the accompanying reduction in use of the family car. Reports indicated that the industrial-lubricant consumption was a new peak. The military requirements including the manufacture of special products for aviation and other war uses expanded from month to month.

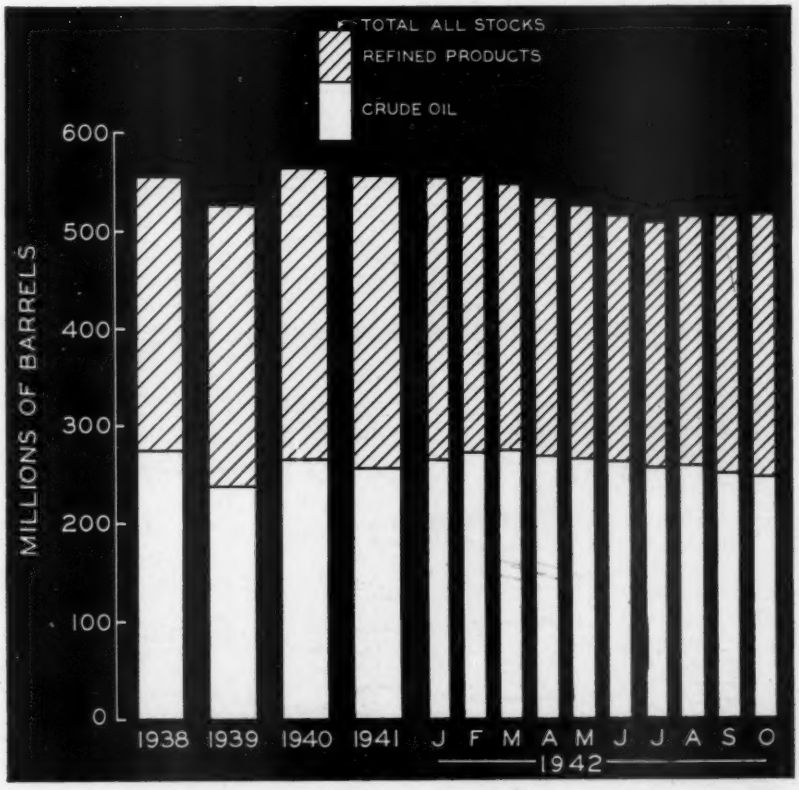
Most manufacturers of lubricants look to the motor car as the outlet for the bulk of their products and this demand decreased during the closing months of 1942 compared to the same period in 1941. So long as gasoline rationing continues these

(Continued on Page 239)

STOCKS OF ALL OILS
(Thousands of barrels)

Date—	Crude oil	Refined products*	Total
Jan. 31, 1942	264,074	289,217	553,291
Feb. 28	272,073	283,909	555,982
Mar. 31	273,569	272,539	546,108
Apr. 30	269,195	263,361	532,556
May 31	265,745	258,611	524,356
June 30	262,313	252,819	515,132
July 31	255,976	251,863	507,839
Aug. 31	258,810	254,831	513,641
Sept. 30	250,210	261,840	512,050
Oct. 31	248,229	264,020	512,249
Nov. 30†	244,824	257,709	502,533
End of year			
1941	257,063	298,480	555,543
1940	264,079	299,875	563,954
1939	239,978	285,860	525,838
1938	274,958	280,963	555,921

*Includes natural gasoline.
†Not included in chart.



War Demand Assures Steady REFINERY OPERATIONS

by H. Stanley Norman

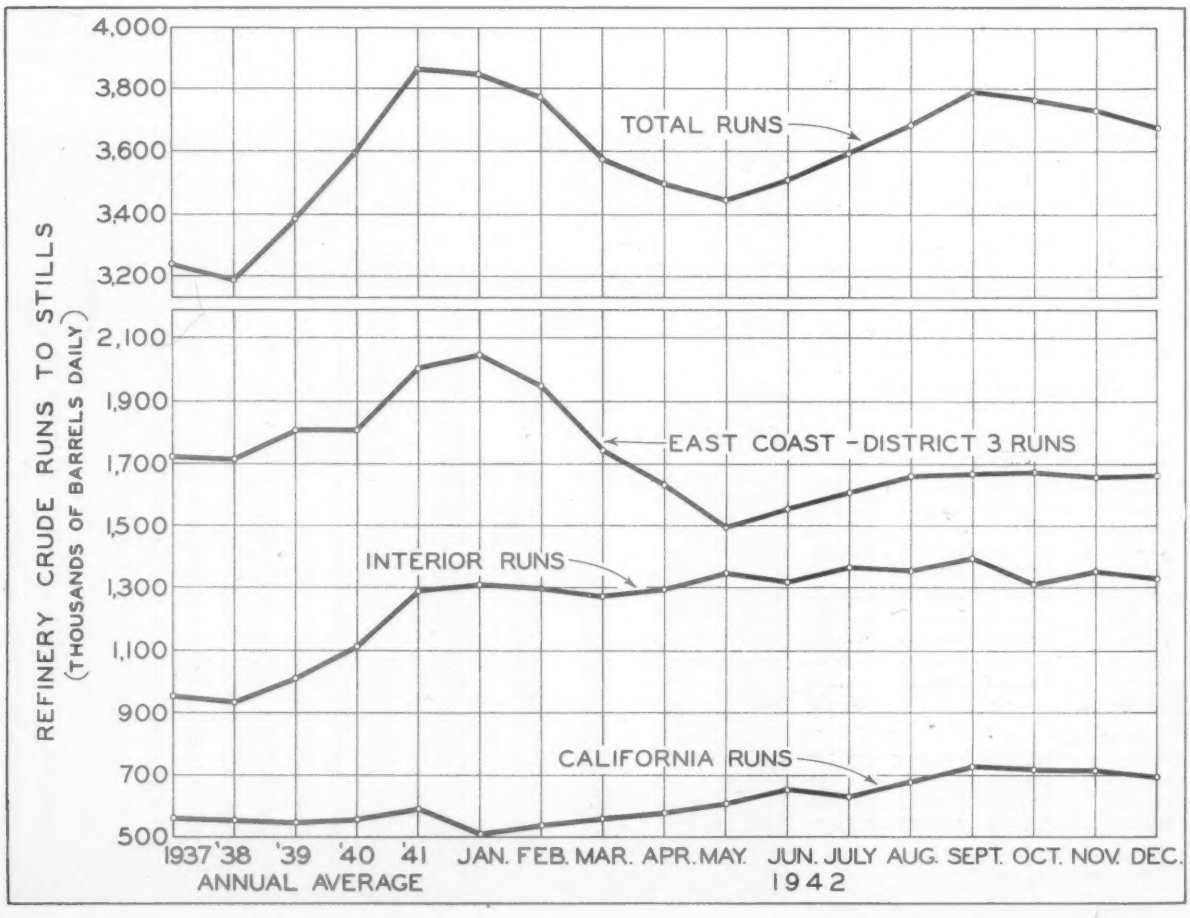
MINIMUM crude-oil runs to stills in 1943 must be maintained at approximately 3,800,000 bbl. daily in order to manufacture the products indispensable to the war program. Static as this figure appears to be—reasonable fluctuations are assumed—the revolutionary changes in operations facing the manufacturing branch of the industry cause the maladjustments, incompatibilities of certain government directives and the swings in economics in 1942 to appear subordinate in comparison.

Government agencies directing the manufacturing policies of the petroleum industry in this emergency are candidly admitting that the less efficient plants manufacturing nonessential products may be compelled to cease operation because of the inherent stresses and strains of a war economy. Trends in the manufacturing end of the business were fairly well charted by operations in 1942, a year in which were projected expenditures of the largest sums in its history. These indicated trends and some additions not yet visualized will be brought to fruition this year.

Many of the uncertainties which harassed refiners during the first 6 to 10 months of total war have been clarified, although new demands are being made monthly on the productive capacities and on the capabilities of existing equipment. Limits have been virtually reached in many aspects of the conversion program and most of the future demands must be implemented with liberal allocations of steel, noncorrosive and heat-resistant alloys, instruments and other essential tools of the refiner.

Results were attained in 1942 that, at the outset of the war, were considered all but impossible by refiners and economists. Deep channels have

How interior and California refinery operations moved upward to absorb some of the reduction in Gulf and East Coast runs to stills



been cut under the economic structure of certain refining companies but the Office of Price Administration, which long ignored irrefutable arguments for advances, is now committed to a policy of adjusting for conditions which force reduced production of the most valuable products with a simultaneous increase in those at the base of the market structure.

Starting in January 1942, crude-oil runs to stills started on a declining curve that was not arrested until June when it became generally obvious that some of the preliminary projections of manufacturing operations necessary to supply the war economy had been pitched too low. Gradual increases in refinery runs during the third quarter of the year were sustained through September when 3,782,000 bbl. of crude daily were charged to stills.

Second-Quarter Runs Low

Crude oil runs to refineries for 1942 are estimated to have totaled 1,333,971,000 bbl., a decrease of 75,732,000 bbl. from the 1941 all-time peak. The sharpest contraction of refinery crude runs occurred in the second quarter when the daily average for those 3 months of 3,485,000 bbl. was 14 per cent below the fourth quarter of 1941. The East Coast and District 3 refineries absorbed the entire reduction. Runs in those two areas were reduced to 1,560,000 bbl. daily in the second quarter of last year, a decrease of 584,000 bbl., or 27 per cent. Revival of refinery operations in the East Coast and District 3, a development made possible by acceleration of alternate transportation from the Southwest, was mostly responsible for the improved national picture during the last 3 months, a trend that is continuing this year.

After declining to a low of 1,499,000 bbl. during May, the eastern refinery runs to stills reacted upward and leveled off at approximately 1,660,000 bbl. during the last 5 months. Consolidation of statistics on petroleum operations in the East Coast, Gulf Coast and other parts of District 3 prevents a minute breakdown for 1942 and for that reason it is impossible to determine whether all portions of the censored area suffered proportionately. Concentration of railroad facilities on the movement of heating oils to the East Coast during the past 2 months, however, indicates that eastern refineries probably are operating at a relatively lower rate of their prewar schedules than in the case of Texas and Louisiana plants.

Refinery gasoline production last year averaged about 39.6 per cent on crude charged to stills, a decline of 4.6 per cent from the rate prevailing in 1941. Lowest rate of production during the first 11 months was reported in June when refiners recovered 37.8 per cent gasoline from crude charged to stills. Gasoline production opened the year at a rate of 44.6 per cent on crude charged and stayed above the 40 per cent level until April. Thereafter, the production rate stayed consistently below 40 per cent but resisted efforts of various government agencies to force output down to between 35 and 37 per cent. Most of the resistance came from interior refiners who were under almost constant pressure to supply heavy motor-fuel demand within their normal trade territories through the end of November.

TABLE 1
Crude-Oil Runs to Refinery Stills, 1942
(Thousands of barrels daily)

	Eastern	Interior	California
January	2,043	1,302	495
February	1,947	1,299	532
March	1,741	1,271	555
April	1,630	1,293	574
May	1,499	1,344	605
June	1,552	1,314	645
July	1,606	1,365	627
August	1,660	1,350	672
September	1,662	1,397	723
October	1,669	1,308	717
November	1,659	1,357	712
December	1,660	1,326	692

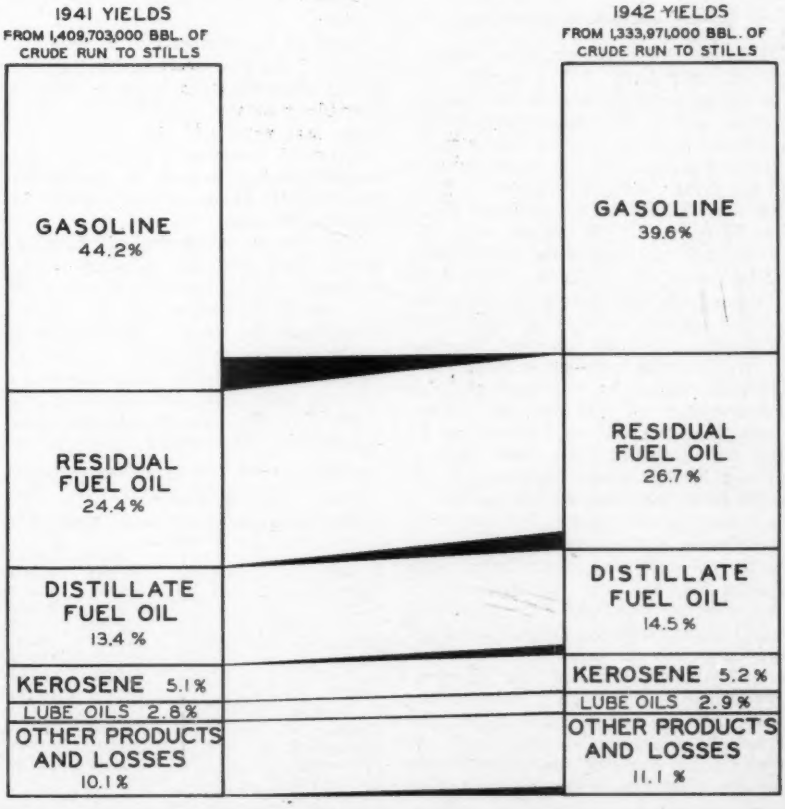
TABLE 2
Per Cent of Crude Run by Refining Districts

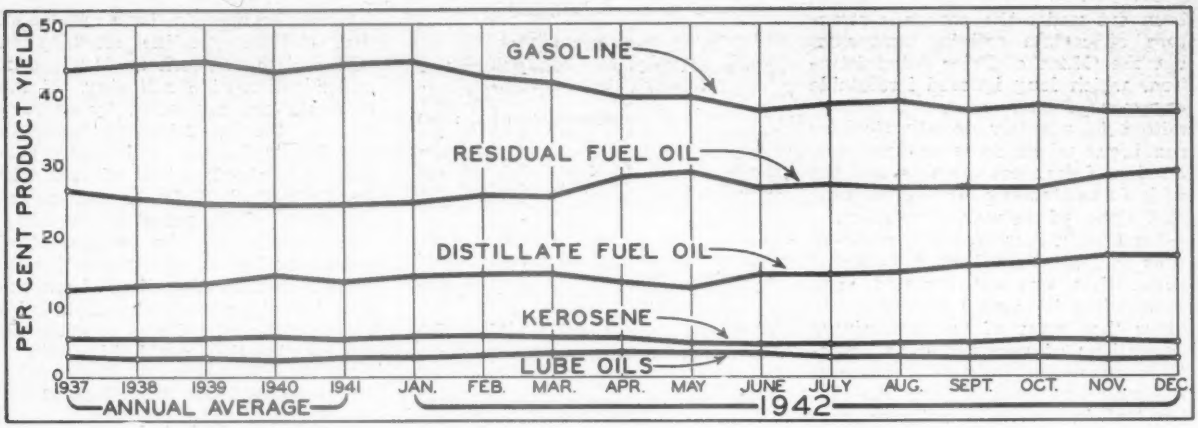
	Avg.	1942 Jan.	1942 May	1942 Dec.
Eastern	52	53	43	45
Interior	33	34	39	36
California	15	13	18	19

Some economists have predicted that civilian gasoline consumption will decline as much as 40 per cent under nation-wide rationing. If the forecasts are supported by demand figures, the incentives to maintain gasoline production at the rates prevailing in the last half of 1942 will be diminished. Refiners and representatives of the petroleum administrator admit that the assignment of increasing fuel-oil yields would have been materially simplified if encouraged by price adjustments. Economics virtually forced refiners to make all the gasoline they could ship.

Gasoline Yield Subordinated

Extent to which it has been possible to subordinate gasoline yields is illustrated by operations in District 3 as disclosed recently by Bruce K. Brown, assistant deputy petroleum administrator. During the last 6 months of 1941, Gulf Coast plants produced 40 per cent gasoline, based on crude. In recent months, while running approximately 20 per cent less crude, motor-gasoline production has been reduced to about 28.5 per cent. The inland plants of District 3 have reduced their average gasoline production to around 39.5 per cent, based on crude, while running 20 per cent less oil than a year ago when motor-fuel yields averaged nearly 50 per cent. The average of all plants in District 3 during the final quarter of 1942 shows motor-fuel yield of





Reduced production of gasoline was accompanied by higher recoveries of distillate and residual fuel oils, a trend that is destined to become increasingly important in 1943 operations

about 31 per cent, based on crude, compared with 42.2 per cent during the last half of 1941.

Emergency demands for residual fuel oil to meet requirements of war industries, Allied shipping, railroad transportation and nonconvertible heating units are so directly related to military operations that all necessary pressure will be exerted to fulfill these obligations. Refineries which are producing exclusively for domestic consumption may be compelled to drastically curtail, or possibly completely cease, operations of cracking plants in order to obtain larger volumes of fuel oil.

Some Conclusions Apparent

Despite the certainty that drastic adjustments are in prospect for the manufacturing branch of the industry there are some unalterable conclusions which can be drawn from known data on product requirements. In the first place, production of 325,000 to 345,000 bbl. of aviation gasoline daily, mostly 100-octane, will offset 30 to 45 per cent of the anticipated curtailment in civilian motor-fuel consumption. Furthermore, there are certain plants, because of their location with respect to shipping, the war fronts or crude supplies, in which operations cannot be modified without interrupting military delivery schedules. The nonmilitary byproducts of the war-essential refineries will be moved into commercial channels at expense of less necessary supplies.

A significant trend in refinery operations is the extent to which virtually all modern plants have been woven into the war requirements in one way or another. Comparatively small plants with no special facilities are diverting certain cuts to refineries with equipment for further processing the selected stocks into war products. This trend is not exclusively reserved to the small refineries for some of the largest units on the Gulf Coast are concentrating their special cuts of butane and butylene for production of synthetic rubber.

Most of the new technical developments of the year were withheld from public dissemination because of their possible military significance. However, last year and this will, in the opinion of most technicians push the manufacturing branch of the industry 10 years ahead of the prewar development pace.

The tempo of technical developments in petroleum refining was a military and economic blessing on the one hand and a political boomerang on the other. Developments came so fast that many politicians couldn't keep pace and, therefore, viewed each new disclosure as evidence that the petroleum refining industry was attempting to thrust itself into military-production programs where it didn't belong. Consequently, the industry has been compelled to devote an inordinate amount of time in defending its processes against competitive interests striving to inject frequently inferior or inadequate methods into the war-production picture.

TABLE 3—Production of Light Petroleum Hydrocarbons

(Thousands of gallons)

	Natural gasoline	Recycle	Isobutane	L.P.G.	Total	L.R.G.
January	179,928	61,362	10,080	63,126	314,496	9,954
February	168,840	54,684	9,156	51,576	284,256	10,248
March	173,082	59,346	10,248	52,164	294,840	9,660
April	161,490	47,754	8,358	45,192	262,794	12,768
May	170,436	53,760	9,534	48,426	282,156	21,798
June	162,792	52,206	9,492	50,946	275,436	21,042
July	170,478	54,600	10,080	50,610	285,768	20,622
August	173,082	56,028	9,534	56,532	295,176	18,606
September	173,250	54,978	9,324	56,364	293,916	17,010
October	180,390	57,078	10,626	56,658	304,752	13,272
November	167,790	55,902	11,424	65,436	300,552	17,094
December	171,885	57,325	16,290	67,000	312,480	18,290

TABLE 4

Daily Average Natural-Gasoline Production, Barrels

	1942	1941
January	241,000	158,000
February	242,000	163,000
March	226,000	159,000
April	209,000	166,000
May	217,000	167,000
June	219,000	170,000
July	219,000	169,000
August	227,000	182,000
September	233,000	189,000
October	234,000	192,000
November	239,000	200,000
December	240,000	196,000

Aviation Program Increasing

The 100-octane program, increased to new peaks several times last year and not even now set high enough to preclude further upward adjustment, directly involves 57 refineries. There are 22 major oil companies and 35 smaller concerns directly implicated. The directly involved companies, of course, are in addition to the much larger number of plants which are contributing some fraction of their production to feed the more modern alkylation, isomerization and hydrogenation facilities.

Petroleum Administration officials are attempting to concentrate a majority of the latest increment in aviation-gasoline capacity on the Pacific Coast. California refiners have been called on for large volumes of fuel oil because of the Pacific military operations and for the maintenance of the long over-sea supply lines to Australia, Guadalcanal, Hawaii and the scores of fortified islands.

(Continued on Page 225)

How Pipe Lines Supply East Coast

by Paul Reed

TO swing over suddenly from supplying the East Coast largely by tanker to a program for overland transportation of petroleum shipments meant that pipe lines and railroads suddenly faced abnormal burdens. Since the withdrawal of ocean tankers early last year, provisions already made up to this time for handling these overland movements have exceeded predictions made by a considerable number of transportation executives in conferences held last spring to cope with the emergency.

What has been accomplished would be more apparent to the general public now if it had not been that military demands for deliveries of petroleum products to the East Coast rose rapidly during the latter part of 1942, particularly since the opening of the North African front. During peacetime when the East Coast was being mainly supplied by tankers delivering about 1,300,000 bbl. daily, less than 10 per cent of East Coast requirements arrived by pipe line. Now it is estimated that less than 10 per cent of the 1,000,000 bbl. daily delivered to the East Coast arrives by tankers.

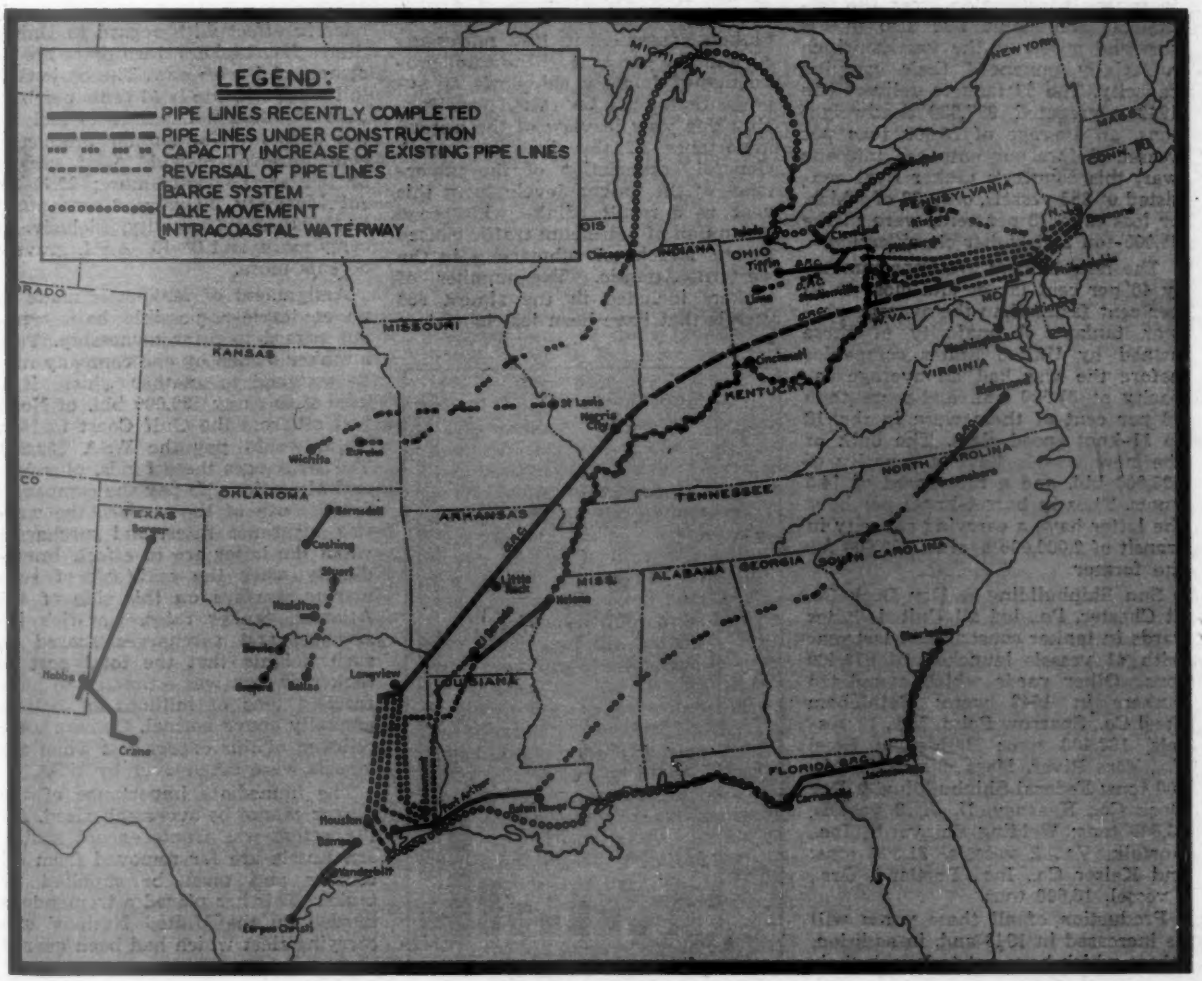
Rails Augment Supplies

From negligible peacetime tank-car shipments between the Southwest and the East Coast, railroads inaugurated huge wartime movements attaining a peak of 857,000 bbl. daily for 1 week in September when special effort was being made to increase rail shipments to 1,000,000 bbl. per day; this goal was never achieved. Declining from this peak railroad shipments dropped to an average of about 750,000 bbl. daily toward the end of the year owing to tank-car failures as a result of severe service.

At the present stage of the war, transportation is presenting the most serious difficulties to both Axis and United Nations forces. Shipping petroleum products to forces at Australia, New Guinea, Guadalcanal and North Africa requires tankers formerly in

(Continued on Page 87)

Map showing developments resulting from the 1942 national program of the Government and the industry for increasing petroleum shipments eastward



Tanker Program Dwarfs All Previous Building Efforts

by J. P. O'Donnell

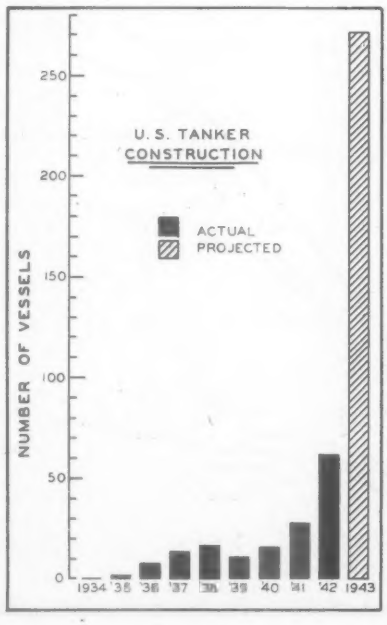
WHILE 1942 witnessed the completion of the largest number and the greatest tonnage of tankers in United States shipyards since completion of the World War 1 construction program, this record will be dwarfed by the 1943 projected goal. Sixty-two tankers were completed in 1942, an increase of 120 per cent over the 1941 total. However, the 1943 schedule calls for the completion of 271, including a number of coastal type vessels, which would be a 300 per cent gain over 1942 and a 900 per cent above 1941.

Last year was not only outstanding in tanker construction from the numerical standpoint but also in the size and speed of the vessels which materially enhanced their carrying capacity. The 62 tankers delivered in 1942 aggregated 997,900 deadweight tons, an average of 16,000 tons per vessel. Before our entrance into the war, this country's tanker fleet consisted of 353 vessels, only 32 of which, or less than 10 per cent, were in the 15,000-ton and higher classification.

The new tankers are approximately 40 per cent larger and close to 40 per cent faster than the average prewar tanker. A majority of those owned by United States companies before the war had an average capacity of 87,500 bbl. and more than 50 per cent of them were in the 10 to 11-knot speed class. The bulk of the new vessels have a capacity of 138,000 bbl. and a rate speed of 14.5 knots. Thus in barrel-knots per hour the latter have a carrying capacity in transit of 2,000,000 against 920,000 for the former

Sun Shipbuilding & Dry Dock Co. at Chester, Pa., led all United States yards in tanker construction last year with 41 vessels launched of 673,400 tons. Other yards which completed tankers in 1942 were: Bethlehem Steel Co., Sparrow Point, Md., 13 vessels, 197,400 tons; Bethlehem Steel Co., Fore River, Mass., 3 vessels, 45,400 tons; Federal Shipbuilding & Dry Dock Co., Kearney, N. J., 2 vessels, 33,800 tons; Welding Shipyards, Inc., Norfolk, Va., 2 vessels, 31,300 tons; and Kaiser Co., Inc., Portland, Ore., 1 vessel, 16,600 tons.

Production of all these yards will be increased in 1943 and, in addition, others which have yet to launch their first oil-carrying vessels will start production. The building of tankers has been delayed by the lack of propulsion units but the delivery rate in December, when it reached an average of one every 3 days against an average of one every 6 days in the preceding 11 months, indicates that the program is now moving into high gear. Sun Shipbuilding, which introduced an accelerating factor in welded construction, delivered 7 tankers in December, a figure that will be closer to its 1943 average than the 3½ per month average, for all of 1942. December also witnessed the delivery of the first tanker from a Pacific Coast yard. In all, the tonnage of tankers completed in 1942 represented but 12.5 per cent of the total production of domestic shipyards, an average that must be raised considerably this year in view of the critical importance of this type of vessel. General appreciation of the importance of the tanker development this year as a result of the widespread disruption of petroleum traffic caused by the attacks of submarines in the western Atlantic. The number of tankers included in the almost 600 vessels that have been lost in waters adjacent to the eastern shores of the Western Hemisphere is not known but since tankers constituted about 17 per cent of the world fleet this would indicate that possibly 100 or more have been sunk in these waters alone. Besides the hazards experienced in adjacent water, United States tankers meet others in supplying oil to Africa, the United Kingdom, and Russia across the Atlantic and to outposts in the Pacific from Guadalcanal and Papua to Dutch Harbor. Supplying the demands of the armed forces is the first task of the tanker fleet with the demands of war industries second and civilian requirements last.



Maximum Efficiency Sought

In an attempt to attain the maximum efficiency in the use of tankers, the War Shipping Administration requisitioned all carrying the United States flag on April 20, 1942, on a time-charter basis. The tankers are operated by the oil-company marine departments but their usage is directed by WSA. Occasionally when circumstances permit, tankers are assigned to the oil companies which pay the WSA rates which the administration has prescribed. These WSA prescribed rates are the only ones in effect with regard to United States flag tankers since there are no commercial rates now. The basic Gulf to New York rate is 40 cents per barrel for gasoline. Other rates include: No. 2 fuel oil or similar product, 1 cent more; oil of 30.1° A.P.I. gravity or lighter, 1.5 cents more; 20.1°-30° A.P.I. gravity, inclusive, 3 cents more; 10.1°-20° A.P.I. gravity, inclusive, 4 cents more, and 0°-10° A.P.I. gravity, 5 cents more.

Assignment of tankers is made on an equitable-as-possible basis without regard to prior ownership. Thus a tanker owned by one company may be assigned to another which, if it used it to carry 130,000 bbl. of No. 2 fuel oil from the Gulf Coast to New York, would pay the WSA $53,300. The WSA uses these funds, plus federal allocations, to pay the companies for the use of the vessels, the war-risk insurance rates, and surcharges when the latter are in effect. Immediately after the outbreak of submarine warfare on this side of the Atlantic, tanker rates, war-risk insurance, and surcharges soared to such heights that the total cost to tanker owners was estimated to have reached tens of millions of dollars annually above normal. Owners were relieved of this excess cost when the vessels were taken over by WSA.

The immediate importance of the tanker cannot be overemphasized. All the active war fronts except southern Russia are far removed from oil sources and must be supplied by tanker. This has placed a tremendous burden on the United Nations' oil-carrying fleet which had been geared to peacetime needs.

How Pipe Lines Supply East Coast

(Continued from Page 83)

Gulf Coast-East Coast service. The quick but expensive substitute for tankers has been railroad transportation. The most economical and practicable substitute from the standpoint of national welfare over a period of time is more extensive use of pipe lines. (Comparative costs of petroleum-transportation mediums were discussed in "Pipe Lines Will Compete With Ocean Tankers," The Oil and Gas Journal, p. 58, Jan. 7 issue.)

Although supplies of petroleum products for civilians in the East Coast have been curtailed, all petroleum supplies required by the Army and the Navy have been delivered promptly by the industry in the quantities specified.

Projects Being Completed

General plans for revamping pipeline transportation of the country were determined in conferences of company executives and government officials held in March and April of 1942. It is remarkable that at this time, in less than a year after the crisis became acute, practically all of the projects recommended by the industry have been completed or are in advanced stages. In many cases more time has been required to obtain permits than to do the work. Much credit is due to the energy of officials in PAW, WEP, WPB, RFC and the major pipe lines who have been pushing ahead against obstacles of red tape as well as difficulties in the field.

The national pipe-line program, according to a recent announcement by Petroleum Administrator for War Harold L. Ickes, is responsible for the laying of 2,700 miles of pipe, half of which has been dug up from old lines. About half of these lines are owned by DPC. This program has two parts: (1) The greatest utilization of existing lines and increase in effectiveness by installation of loops, extensions, additional pumping equipment and the linking of systems by new lines as well as conversion and reversal of numerous crude and products lines. (2) Construction of large-diameter lines from Texas to the New York-Philadelphia area.

Deliveries of crude and products to the East Coast through existing lines have been stepped up to 160,000 bbl. daily as a result of work done from Texas eastward as the first part of the national program. According to Mr. Ickes, this is a 400 per cent increase over what was delivered at the beginning of 1942.

The second part of the program has already materialized in the War Emergency Pipelines, Inc., 531-mile, 24-in. crude-oil line now more than 90 per cent completed, which will be operating between Longview, Tex., and Norris City, Ill., in February. WEP runs will average 120,000 bbl. of No. 2 heating oil and 180,000 bbl. of crude with a total daily movement of 300,000 bbl. which will be transshipped eastward by tank car. Completion of the 24-in. extension to the New York-Philadelphia area is scheduled for June. However, recent increases in military demands exceed the capacity of this line.

Mr. Ickes is urging that steps be taken immediately to lay a second 24-in. line, extending from Gulf Coast refineries in the Houston and Beaumont-Port Arthur area to the New York-Philadelphia district for shipping refined products. As soon as practicable he wishes to start a third line of 20-in. to connect Gulf-East Coast points. A committee of six engineers has been studying the merits of two routes for a products system. One would go directly from the Beaumont-Port Arthur area across Tennessee and Kentucky. The other would be 35 miles longer but would be more economical for construction and operation because it would follow the route of the 24-in. crude line from Little Rock, Ark., eastward.

The three lines together would have an estimated total capacity of more than 850,000 bbl. daily. The large savings in tanker facilities effected by these lines is indicated by the situation which will exist when the first 24-in. line is completed eastward. Then, there will be a saving of 85 tankers due to the shortening of courses when tankers can sail to North Africa from New York instead of the Gulf Coast.

Ickes Given Credit

Full credit for initiating and gaining acceptance of the large-diameter lines is given to Mr. Ickes by executives in the industry who are concerned with these big projects.

The economic effects of the large-diameter lines to the East Coast may be somewhat obscured during the war by the manner in which the business of WEP systems will be handled. The Government will buy a shipper's oil at one end of the line and sell it to him at the other end at a higher price, arbitrarily fixed on a basis to make the transactions practicable for the nation and the industry. Profits from operating the line are to reduce the burden on the Government for compensating major companies for the wartime removal of tankers from East Coast service. The large-diameter lines will operate at higher efficiency and lower transportation costs than any other medium for similar service.

Defense Plant Corp. is building "big inch" oil line facilities with the expectation that they will be sold to oil companies after the war emergency.

Progress in the program for utilizing existing lines may be reviewed most methodically by dealing with one project at a time.

Before going into these in detail, it should be mentioned that directives order that Shell, Pan American, Sun-Stanolind and Atlantic crude-oil lines between East Texas and the Gulf Coast are to be reversed to feed the WEP 24-in. trunk line. Pan American and Sun-Stanolind are now ready to reverse for moving No. 2 heating oil northward.

Other Measures

Project 1. — To increase crude-oil movements from Texas northeastward a number of changes have been made. Stanolind Pipe Line Co. is completing 56 miles of 12-in. loops between Graford, Tex., and Healdton, Okla. Oklahoma Pipe Line Co. is laying 10¼ miles of 10-in. between Healdton and Hewitt, Okla., to take about 10,000 bbl. daily into its system for delivery through northern connections. Across Ohio, Illinois Pipe Line Co. (now Ohio Oil Co.) laid 152 miles of 8-in. loops, increasing capacity by 15,000 bbl. daily. The Ohio loops are owned by DPC. Tuscarora Oil Co., Ltd., is increasing capacity of lines across Pennsylvania. Increase in capacity scheduled for Project 1 is 27,000 bbl. daily.

Related to but not directly connected with the general program for Project 1, are a number of other measures. Texas Pipe Line Co. laid more than 100 miles of 8-in. and 10-in. loops between Dallas, Tex., and Stuart, Okla. Texas-Empire Pipe Line Co. added station equipment in Kansas and Missouri and laid loops in Illinois which increased daily capacity to the Chicago area by 30,000 bbl. Capacity of the Tidewater Pipe Co., Ltd., in Pennsylvania was increased 2,000 bbl. Southern Pipe Line Co. in Pennsylvania increased capacity of its system by 5,000 bbl. daily.

Project 2.—Plantation Pipe Line Co. is expanding capacity of its products system from 60,000 bbl. to 90,000 bbl. daily by the installation of 14 booster stations. An extension on the northern end from Greensboro, N. C., to Richmond, Va., is being laid by Plantation acting for and in behalf of DPC. After March 1 deliveries of 30,000 bbl. daily will be made at Richmond. To feed 60,000 bbl. daily to the Baton Rouge, La., terminal of the Plantation system, 75 miles of 8-in. and 200 miles of 10-in. are being laid from the Houston refining area via the Beaumont-Port Arthur area. Construction of the project known as the Bayou Pipe Line Co. is handled by Shell Pipe Line Corp. It is scheduled to be in operation the latter part of this month. The Bayou Pipe Line Co. is owned by companies which planned the line.

Project 3. — Ohio Emergency Pipe Line, Inc. (DPC) has recently com-

pleted 82 miles of 8-in. from Tiffin to Akron, Ohio, to connect Shell and Standard products lines with the Sun-Susquehanna system which has been reversed. Capacity of Shell's line between Zionsville, Ind., and Lima, Ohio, has been increased. Capacity of Ohio Emergency line is rated at 15,000 bbl. daily.

Project 4.—Shipments on the Great Lakes were increased during the navigation season. Lake shipments of products arriving at Buffalo, N. Y., have been moved through the reversed Keystone Pipe Line Co. system. The Keystone line, extending eastward from Pittsburgh, Pa., has been reversed for handling deliveries of 25,000 bbl. daily to the Atlantic seaboard. The 6-in. line of Sinclair (Union) rated with a capacity of 12 000 bbl. is being extended from Greensburg, Pa., to Steubenville, Ohio. Sinclair interests are trying to get a federal permit to lay an 8-in. line from Wood River, Ill., to Steubenville. Present PAW plans call for using Sinclair line to move products eastward from Steubenville.

The Susquehanna Pipe Line, with daily capacity of about 15,000 bbl., has been reversed across Pennsylvania.

Throughput of the Socony-Vacuum line has been increased to feed the Susquehanna line for movements South and East.

Project 5.—A network of crude-oil lines belonging to Gulf, Texas, and Magnolia has been converted to refined-products service and reversed for moving shipments from Gulf Coast refineries to El Dorado, Ark., where they enter the 158 miles of 10-in. laid last summer to Mississippi River terminal at Helena, Ark. The line is expected to move 55,000 bbl. daily by February 15.

Additional Projects

Since the original program of OPC was drawn up in the spring of 1942, several additional projects including the following have been added.

Project 12.—Trans-Florida Pipe Line Corp. (DPC) is laying a 185-mile 8-in. products line from Carrabelle to Jacksonville, Fla., which is to be completed late in February. Shipments received from Gulf Coast barges will be delivered to East Coast barges which will be towed as far north as South Carolina. Capacity of line is rated at 35,000 bbl. daily.

Project 13.—Sinclair Refining Co.'s 8-in. line from Corpus Christi, Tex., will bring sweet oil to the company's pipe line at Damond Mound, near Houston, Tex. This is the first line to be built to compensate to some extent for the loss of East Texas oil diverted from major Gulf Coast refineries to the WEP line. Plans are being considered for another system in the area which may be built by Humble Pipe Line Co. for bringing sweet crude oil from Corpus Christi to Baytown. The Humble project may make some use of existing natural-gas lines.

Early this month Magnolia Pipe Line Co. laid 15 miles of 6-in. connecting the company's system with the Barnsdall line. The linking line extends from Vanderbilt to Placedo, Tex. Shipments of sweet crude will be moved to the Magnolia trunk line at the rate of 12,000 bbl. daily.

Project 14.—To provide transportation for crudes needed by Texas refineries for war products, Texas Pipe Line Co. is laying a line from Paradis through Erath, La., to Port Arthur, Tex.

Project 15.—To increase shipments through the Great Lakes Pipe Line Co.'s system several provisions have been made. A group of refiners laid a 6-in. line from the Cushing area to Barnsdall, Okla. Several booster stations have been built to increase deliveries by 10,000 bbl. daily to Kansas City, by 11,000 bbl. daily to Des Moines, Iowa, and by 5,500 bbl. daily to Minneapolis, Minn.

Among the numerous lines which have been dug up to furnish pipe for the new construction are the following:

Gulf-Magnolia line from Ranger to Panhandle, Tex.; Illinois Pipe Line Co.'s system in the Del Rio, Tex., area; American Liberty Pipe Line from East Texas to the Gulf Coast and Sinclair Refining Co.'s line from Ringling, Okla., to Kingsmille, Tex. These were all crude lines.

Early in 1942 before the national pipe-line program was definitely launched, Phillips Petroleum Co. had construction under way on pipe-line facilities which would aid in supplying refined products needed for the war. Between Wichita, Kans., and St. Louis, Mo., 195 miles of 6-in. and 8-in. loops were laid. For feeding the company's Borger refinery, 306 miles of 6-in. and 8-in. were laid which connected natural-gasoline plants in the Hobbs, N. M., and Goldsmith, Tex., areas.

Barge movements along rivers and other shallow waterways have had a wide popular appeal. A new program has been started to increase barge shipments which is described elsewhere in this issue.

Many attempts have been made to find substitutes for large-diameter steel pipe lines going in a fairly direct route from Texas to the East Coast. Experience so far indicates that big lines are the only sure effective means for delivering large volumes of petroleum continuously and cheaply to the East Coast.

Barge Shipments on Inland Waterways to Be Expanded

A PEAK of 240,000 bbl. daily late in the summer of 1943 is predicted for inland waterway barge shipments destined to supply East Coast oil needs, if the Government's program can be carried out on schedule. The current eastward movement of crude oil and refined products averages approximately 100,000 bbl., according to reports. Before the closing of navigation on some waterways due to winter weather, the total amount moved daily was about 25 per cent more. In the program for this year figures on barge movements will reflect the fact that certain of the expanded facilities will be placed on waterway runs that cross the "statistical" line between District 1 and District 2. The significance of this statement may be explained in the following way:

Present figures only record direct barge shipments from points outside of to points within District 1. They do not show the entire contribution of the inland barge fleet to the flow of petroleum to the eastern states. According to present records, inland waterway movement of petroleum to the East has nearly doubled since last spring from 64,000 bbl. daily during April to about 125,000 toward the end of 1942. In addition to these easily defined barge movements eastward, there are numerous barge movements throughout the country which are reported to have an important integrating effect on shipments of various kinds to the eastern states.

Such integrating barge movements are largely along the Gulf Intracoastal waterway and up the Mississippi River to points where they transship to railroad tank cars for delivery eastward. Barge shipments delivered at terminals on the Ohio River do not appear in records of transportation to District 1, but they make it possible for some railroad tank cars to operate on a shorter haul with a quicker turnaround schedule. It is claimed by those reporting the situation that the

barge fleet is performing its most useful function in the part it is performing in such barge-rail movements.

Within recent weeks WPB has approved a program aimed to enlarge barge facilities by the early construction of 500 wooden barges of 6,000 bbl. capacity each for transporting residual fuel oil. Approval was also given for building 400 dry cargo wooden barges suitable for replacing steel barges which may become available for conversion to petroleum service. The program also provides for new motive power to make the expanding fleet fully effective. This calls for early completion of 21 steel-hull tug boats with steam engines of 2,000 hp. each and 100 wooden-hull tug boats with diesel engines, each of 600 hp.

Twenty to 30 barges per month are being converted from other cargo service to petroleum transportation. WPB has allocated materials for the conversion of 259 barges for this program.

An example of the manner in which a pipe-line barge-railroad movement has been planned, so as to get the most out of facilities, is reflected by shipments via Project 5. Refined products from refineries in the Beaumont-Port Arthur area enter the network of converted and reversed pipe lines delivering to a new line built of reclaimed pipe between El Dorado and Helena, Ark. Thence, these shipments are taken by barge to Cincinnati, Ohio, for transshipment to eastbound tank cars. The barge trip from Helena to Cincinnati is 18 days while 27 days are required for going to Pittsburgh, Pa. The 9-day saving in turn-around time, by using Cincinnati as a terminal, increases the efficiency of the movement. For shipments to Boston, Mass., only 1 and a fraction days additional are required for the run from Cincinnati than for the run from Pittsburgh.

Barge transportation has a wide popular appeal. Progress made with the barge program will be observed with interest by transportation executives inside and outside the oil industry who have utilized this low-cost medium to some extent in recent years but who have encountered difficulties in efforts to expand barge facilities for handling petroleum shipments on a considerably larger scale.

Dow Chemical Extends Line From Temple Station

Dow Chemical Co., Midland, Mich., one of the world's biggest chemical manufacturers, is building a 12-mile 4 and 6-in. diameter pipe line from its Temple field station to a small gas field in Sylvan Township, Osceola County, Michigan. Dow built 55 miles of 6-in. gas transmission line from the Midland plant to Temple in 1939.

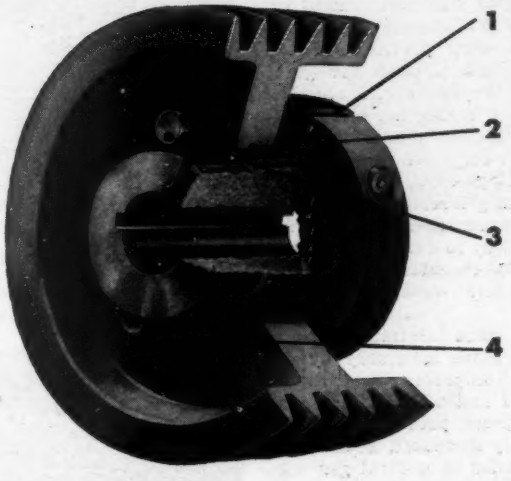
WORTHINGTON

QUICK DETACHABLE

QD SHEAVES

Easy to get on
Easy to get off

...YET ALWAYS TIGHT ON THE SHAFT



1. **SPLIT HUB** for easy mounting or removal from the shaft.
2. **TAPERED FIT** between split hub and rim for easy mounting or removal of rim from hub.
3. **PULL-UP BOLTS** which pull the rim onto tapered split hub for tapered friction drive assembly and positive press fit on the shaft.
4. **TAPPED HOLES IN RIM** for using pull-up bolts as jack screws to free the tapered friction fit when detaching rim.

Ask our nearest District Office for a demonstration of the Time-Saving, Labor-Saving and Material-Saving advantages of the QD Sheave.

MV3-2

WORTHINGTON

COMPLETE DRIVES — MULTI-V-DRIVES — SHEAVES OR BELTS ONLY

WORTHINGTON PUMP & MACHINERY CORPORATION · GENERAL OFFICES: HARRISON, N. J.

Quarter of Gas Output Goes to War Industries

by Arthur F. Bridge*

ACTUATED by one primary motive —the strengthening and furthering of the nation's war effort—the gas industry in 1942 exerted every effort to increase America's wartime productive capacity to its maximum.

The outstanding development of the year was the mounting demands of war industries for gas fuel, approximately 25 per cent of the present deliveries of natural gas being used by war industries at the year end.

As a result of this accelerated use of gas in the fabrication of the implements of war, particularly the making of precision parts for guns, tanks, planes, ships, shells, etc., it became necessary during the latter part of the year for the War Production Board to issue orders limiting certain uses of natural gas. Orders prohibited new gas-heating installations in certain critical areas and provided for steps to be taken to curtail consumption in time of threatened shortages. Later the orders were revised and tightened.

Issuance of these Limitation Orders by WPB was made necessary by the fact that gas companies were unable to obtain steel and other critical materials to expand present capacities to meet greatly increased demands.

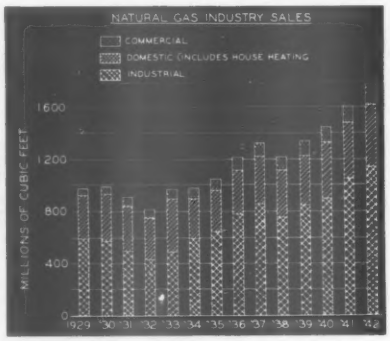
Industrial sales of natural gas registered an increase of 58,911,000,000 cu. ft. at the end of 1942, bringing the total sales to 908,476,000,000 cu. ft. This was a percentage increase of 6.9.

Sales of natural gas for domestic uses registered an increase of 13.3 per cent—bringing the sale for that purpose to 479,274,000,000 cu. ft.

Indications are that the total production of natural gas in 1942, including amounts used in the manufacture of carbon black and for field purposes, will reach a total in excess of 3 trillion cubic feet. Some 232 billion cubic feet of natural gas were used as fuel for generating electric power in 1942, an increase of 29 billion cubic feet over 1941. In several instances, the above figures established new records.

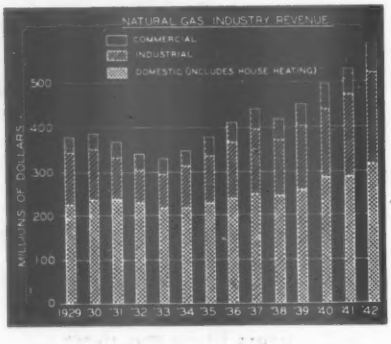
It is estimated that 55 per cent of the nation's productive capacity is being devoted to the prosecution of the war. In the all-important metals field, where industrial gas is so extensively used, it is much greater.

While many gas furnaces of special design are being installed to take care of unusual production problems,



Top: Sharp expansion of industrial volume features trend in consumption

Bottom: Domestic customers supply more than half of gas utilities' revenue



it is a significant fact that by far the greatest amount of production from gas equipment is in furnaces the designs of which were thoroughly tested out before the war started. Where special designs of gas-heating equipment have been deemed advisable and desirable, the industry has drawn on its store of research and engineering knowledge and quickly produced suitable, automatic, heat-treating machines that fit perfectly into the exacting requirements and are speeding the tempo of our vast war production plants.

It is evident that more and more emphasis will be placed on dehydrated food to supply our overseas forces and lend-lease requirements. The clean, controllable qualities of gas are recognized by this expanding industry as highly desirable. During the important steps of storing and packaging dehydrate vegetables, fruits, and other foods, a development of the gas industry is being put to ever increasing use. This development, dehydrated air, protects the processed foods until they are permanently packed for shipment.

Close cooperation with the Petroleum Administration for War by gas companies brought about many developments during the year. Among the more outstanding were (1) the relaxing of restrictions to permit further drilling of wells in the Appalachian region, eastern Kansas, portions of Oklahoma and Missouri, thereby considerably relieving gas shortages in those areas; (2) use of the Playa del Rey oil field, near Los Angeles, as a reservoir to store 2 billion cubic feet of natural gas to be available during peak periods; (3) a thorough study of hydrocarbons and an increase in their production for use in 100-octane gasoline, synthetic rubber, and other war products, with a minimum use of critical materials.

House Heating Ranks Second

Gas for house heating ranks second (coal and coke combined rank first) among the nation's fuels as the census of 1940 discloses that 3,122,577 homes in urban territories reported the use of gas for heating purposes as against 2,260,556 using oil. The American Gas Association's study further indicates that 59 per cent of the new homes constructed in 1941, covered in the above-mentioned survey, report the choice of gas for house heating.

Gas is also a preferred fuel in the defense housing projects sponsored by the various governmental agencies. A recapitulation of 325 such projects constructed as of December 1, 1942, shows that gas is used by 85 per cent for cooking, 81 per cent for water heating, and 36 per cent for space heating.

Appointment by the association of a committee on postwar planning recognizes the vital necessity for preparing now to meet the stepped-up competition immediately following the cessation of hostilities and to prepare for the inevitable dislocation of industry. A survey of gas-company opinion shows that a majority of companies feel that if they render efficient and satisfactory service now their customers will become boosters of gas fuel in the postwar period.

A survey conducted during the year brought out the fact that gas companies were in favor of having the A.G.A. coordinate and supervise the research work of the gas industry.

*President, American Gas Association; vice president and general manager, Southern Counties Gas Co., Los Angeles, Calif.

Tomorrow's Products . . .

Today aviation gasoline, toluene, butadiene are the tools of war in which many KELLOGG-built plants are specializing—products vital to our future and needed in ever-increasing quantities to assure Victory.

The accelerated development of these processes of today is swiftly shaping the products of tomorrow. KELLOGG'S share in the solution of the needs of today gives assurance to refiners that KELLOGG plants will meet the new and changing demands of the future.

KELLOGG

DESIGN, CONSTRUCTION and LICENSING

- Catalytic Processes for Cracking, Hydroforming, Reforming, Dehydrogenation, Alkylation, Desulphurization
- Gasoline Products Company, Inc. . . . . Pyrolytic Cracking
- The Polymerization Process Corporation, Thermal and Catalytic Polymerization
- JUK Processes . . . . . for Lubricating Oil Refining with Propane and Phenol • Deasphalting • Dewaxing • Solvent Extraction and Acid Treating Plants

THE M. W. KELLOGG COMPANY • JERSEY CITY, NEW JERSEY • 225 BROADWAY, NEW YORK
Los Angeles: 609 South Grand — Tulsa: Philtower Building

WORLD PRODUCTION Slumps But Revival This Year Is Indicated

by J. P. O'Donnell

CURTAILED transportation facilities and the destruction of producing areas in the Far East and Russia in 1942 combined to effect the most substantial reduction in world-wide crude-oil production in the history of the petroleum industry. It is estimated that world production last year totaled 2,062,500,000 bbl. against 2,227,125,000 in 1941. The decline amounted to 165,425,000 bbl., approximately 7.5 per cent.

The effect of curtailed transportation was 75 per cent more damaging to the annual total than the actual destruction of producing fields despite the fact that demolishment eliminated the important fields of Borneo, Sumatra, Java, Ceram, Burma and the western Caucasus.

Venezuela and Colombia, South America's first and second ranking producing countries, respectively, in 1942 together lost 86,500,000 bbl. as a direct result of the lack of transportation while Russia, deprived of full control of the Volga River since mid-September and pipe-line outlets through the northwest Caucasus, also suffered through disruption of normal transportation facilities.

None of the major producing continents of the world escaped the restrictive influences that developed in 1942. While there were individual increases in some, the gains were invariably offset by greater losses elsewhere. From the standpoint of volume, South America registered the largest decline. There was an appreciable decline in Asia while those in North America and Europe were virtually the same though the proportionate decrease in the latter was, of course, substantially larger.

North America experienced the smallest proportionate decline. The loss of 24,360,000 bbl. was equivalent to only 0.6 per cent. More than three-fourths of the North American decline occurred in the United States where production fell 19,000,000 bbl. Mexico, which suffered from the loss of European markets since the beginning of the war, suffered further in 1942 as a result of the disruption of Western Hemisphere tanker movements. Mexico normally exports 40 to 50 per cent of her production. In immediate pre-war days, two-thirds of the exports went to Europe and less than one-third to the United States. In 1941, 87.5 per cent went to the United States via tanker and last year this substantial volume was subject to vagaries of curtailed and erratic transportation which effected a decline of more than 13 per cent in Mexican production. Canada's production, less than 1 per cent of North America's total, increased more than 3 per cent but was only a minor offsetting factor for the continent.

South American Production Off

Production in South America declined almost 25 per cent entirely as the result of the loss of transportation facilities. The decline of more than 77,000,000 bbl. in the South was almost half of the world total. The bulk of this decline occurred in Venezuela where the annual output dropped 72,350,000 bbl., off almost 32 per cent. But Colombia, where production fell 14,050,000 bbl., was proportionately harder hit since its decline was equivalent to 57 per cent of its 1941 total. Both countries produce far in excess of internal requirements and are dependent on exports for their market. Therefore when Axis submarines concentrated their attacks on Western Hemisphere shipping lanes, they hit the oil industry of these countries in its most vulnerable spot.

There is no prospect of an immediate return to higher production rates for these countries since the tanker situation is still extremely critical.

ESTIMATED WORLD CRUDE-OIL PRODUCTION

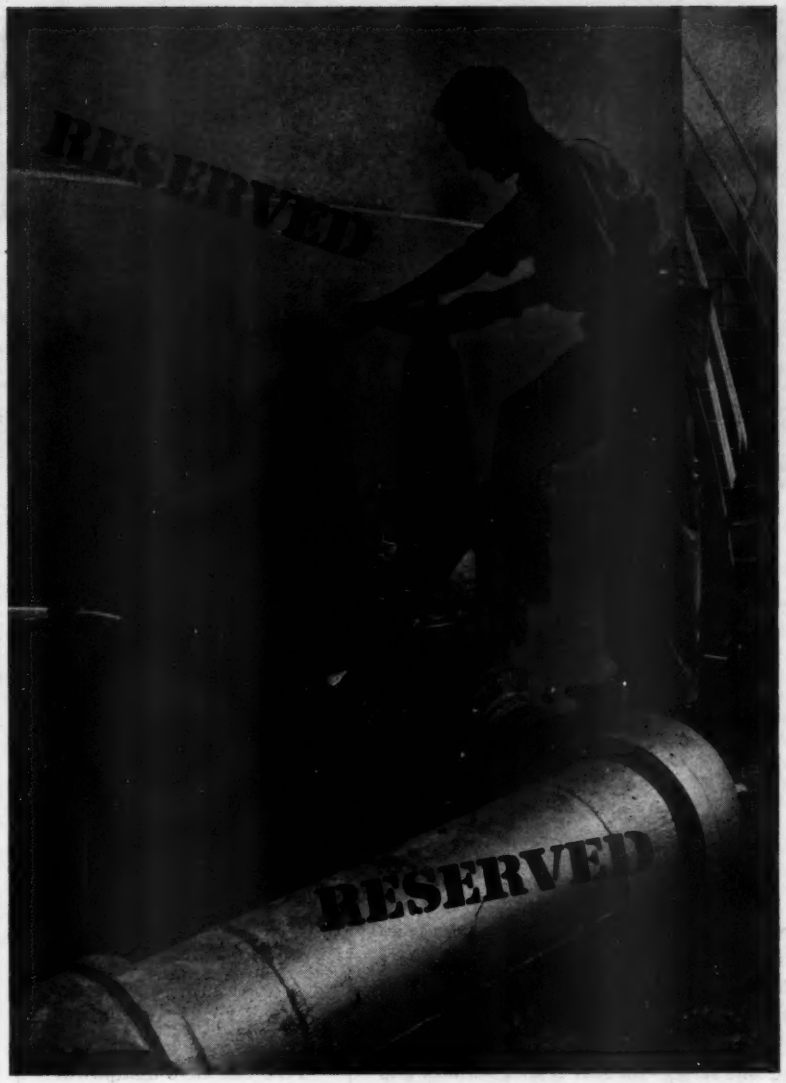
Country—	Total (thousands of barrels) 1942	1941	Change	Dly. av. (bbl. per day) 1942	1941
North America:					
Canada	10,450	10,123	+327	28,650	27,750
United States	1,385,200	1,404,182	—18,982	3,795,050	3,847,075
Mexico	37,000	42,705	—5,705	101,400	117,000
Total	1,432,650	1,457,010	—24,360	3,925,100	3,991,825
South America:					
Argentina	23,275	21,765	+1,510	63,750	59,650
Bolivia	300	275	+25	825	750
Colombia	10,600	24,639	—14,039	29,050	67,500
Ecuador	1,800	1,560	+240	4,950	4,275
Peru	13,150	11,925	+1,225	36,000	32,675
Trinidad	27,375	21,150	+6,225	75,000	57,950
Venezuela	155,800	228,131	—72,331	426,850	625,000
Total	232,300	309,445	—77,145	636,425	847,800
Europe:					
Hungary	4,400	3,300	+1,100	12,050	9,050
Italy*	1,350	1,250	+100	3,700	3,425
Germany†	10,000	9,750	+250	27,400	26,700
Rumania	37,800	38,450	—650	103,550	105,350
U.S.S.R.‡	214,000	238,000	—24,000	586,300	652,055
Total	267,550	290,750	—23,200	733,000	796,580
Asia:					
Bahrein Island	7,800	7,070	+730	21,370	19,370
Burma	2,500	7,900	—5,400	6,850	21,650
India	2,500	2,245	+255	6,850	6,150
Iran	75,600	64,150	+11,450	207,125	175,750
Iraq	14,600	10,000	—14,600	40,000	27,400
Japan§	3,800	3,800	.....	10,400	10,400
Netherlands East Indies¶	9,000	61,000	—52,000	24,650	167,125
Saudi Arabia	6,000	5,750	+250	16,450	15,750
Total	121,800	161,915	—40,115	333,695	443,595
Africa:					
Egypt	8,000	7,800	+200	21,900	21,370
Unclassified	200	205	—5	550	550
World total	2,062,500	2,227,125	—165,425	5,650,670	6,101,710

*Includes Albania. †Includes Austria, Czechoslovakia, Peland, France. ‡Includes part of Sakhalin. §Includes Formosa, part of Sakhalin. ¶Includes Sarawak, Brunei.

However, it is improving and as it improves so do the prospects for Venezuela and Colombia. Increased refining capacity at Aruba, Curacao and Trinidad also enhance the post-war possibilities for producing areas adjacent to the Caribbean. New discoveries were reported in both Venezuela and Colombia in 1942 and while their significance remains clouded owing to the absence of need for development, they imply higher potentials for both countries. It is certain that this increased potential will be utilized to a large extent when sufficient tanker facilities again become available.

Other South American countries were reported to have increased their production in 1942. New refining facilities at Trinidad provided an outlet for increased production there. Argentina, the continent's principal consuming country, made further progress toward self-sufficiency with an approximate 7 per cent gain in the output of oil. Bolivia undertook the largest development campaign in her history after importing substantial quantities of drilling equipment from the United States in the last half of the year. Peru and Ecuador, the only oil-producing countries on the west coast of South America, benefited from that fact as they took over the market from western Colombia to Chile.

Europe's major developments centered in the Caucasus where invading Axis armies captured one field, deprived Russia of her northwestern Caucasus pipe-line system and reached the Volga River which provides the Soviets with their principal internal distribution system. The Kuban or Maikop fields which the Nazis overran in the summer produced 40,000 bbl. of crude oil per day. Their capture represented neither a critical loss to the Russians nor an important gain to the Germans. Production further east was sufficient to sustain Russian needs while destruction in and around Maikop certainly rendered it valueless for a long period of time to the Germans whose hold is now seriously threatened by counterattacking Soviet armies. The pipe-line outlet from the Grozny fields to the western Caucasus was lost to the Russians when German armies reached the western edge of these fields. These losses were probably less important than the partial control the Nazis held over the Volga when they reached its banks around Stalingrad in September. This river, with supplementary canals, constitutes a distribution system reaching as far north as Leningrad. Russia undoubtedly recognized this possibility long before it developed and took steps to overcome it by increasing production elsewhere, principally in the Ural-Volga area where production now is estimated to be in excess of 100,000 bbl. per day compared to less than half that output before the Axis invasion.



. . . for your product *exclusively*

At every General American Terminal your commodity flows through a separate line—with a separate pump—into a separate storage zone from that used for any dissimilar commodity. In addition, you get the protection of trained personnel to speed the handling of your shipments—an especially vital consideration in war-times. General American Terminals are strategically located for your economy.

GATX GENERAL AMERICAN

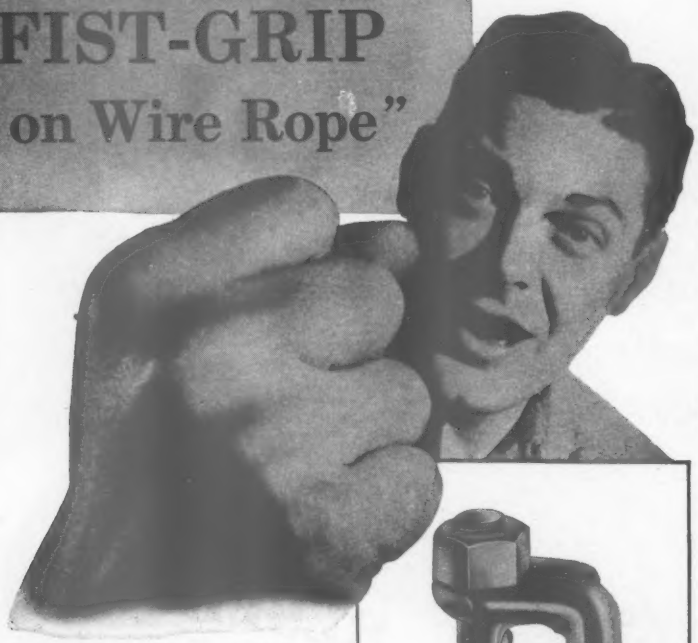
A SYMBOL OF INTEGRITY FOR OVER 40 YEARS

GENERAL AMERICAN TANK STORAGE TERMINALS

Goodhope and Westwego, La. (*Port of New Orleans*)
Carteret, N. J. (*Port of New York*)
Corpus Christi, Texas — Galena Park, Texas (*Port of Houston*)

A Division of General American Transportation Corporation

"Save Bullet-Metal for Our Boys' Guns ... with a FIST-GRIP on Wire Rope"



"YOU can save rope, save clips — just as we do — by using Laughlin 'Fist-Grip' Safety Clips, instead of 'finger-pinch' U-bolt clips that crimp and injure wire rope.

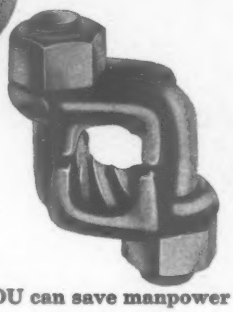
"With 'Fist-Grip' Clips the bolts are on opposite sides — the four bearing surfaces grip like a fist, not a 'finger-pinch'. Three 'Fist-Grip' Clips do the work of four U-bolts! Design is so strong that less steel is needed in each clip. *25% less steel* in all is saved per assembly.

"I figure the rope, clips and steel saved mean more guns and bullets for our boys."

Competitive Tests Prove Greater Holding Power of Laughlin "Fist-Grip" Clips

With 4 U-bolt clips at 37,750 lbs. load, ¾" rope broke at saddle, while only 3 Laughlin Safety Clips held the same load without rope breakage, because extra bearing surfaces grip without crimping. Here's the clip that fights for your country! Investigate!

★ ★ ★ ★



YOU can save manpower and metals with the "FIST-GRIP" CLIP

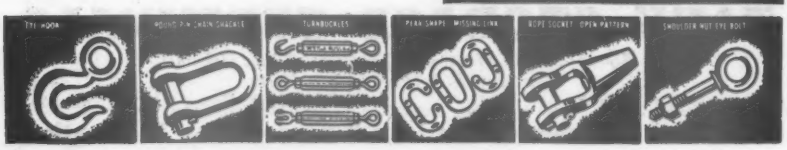
Saves Manpower

greater holding power, less work; can't be put on wrong.

Saves Metals

no special-shaped wrench, fewer clips needed, no spoiled rope, 25% less steel.

THE THOMAS LAUGHLIN Company
PORTLAND, MAINE



Other developments of importance in Europe included Hungary's continued gain. Actual reports are unavailable but conservative estimates place present Hungarian production at 12,000 bbl. per day with a possibility of it reaching 15,000 to 17,000 bbl. dependent on the rate of development of new fields. Another important development was the disclosure that commercial production has been discovered in England. Actually this discovery antedated 1942. Its location and the volume of production cannot be disclosed but its importance is apparent from the fact that a score of rigs were sought in this country for its exploitation.

Near East Fields Increase

Capture of Netherlands and British East Indian and Burma fields by the Japanese was the major Asiatic development of the year though another of importance was the general increase in the Near East area including the Persian Gulf and the Egyptian fields in northeastern Africa. The Near East increase was attributed to the acceleration in the tempo of United Nations' war activities in that area and to the loss of the far eastern fields. These war developments made it necessary to supply countries previously dependent on the East Indies, from other sources, doubtless including the Persian Gulf. Japan is obtaining some oil from the Indies now but the quantity is governed by several factors, principally by shipping which has suffered severely because of heavy tanker losses. Japan is believed to have gained virtually nothing from an oil standpoint in the conquest of Burma. The only outlet of consequence from the Burma fields was the pipe line to Rangoon which, with the wells along the Irrawaddy and the refinery at Rangoon, was effectively wrecked. Other far-eastern developments of more than passing interest in 1942 were the shipment of several large rigs to New Zealand for the testing of deep formations there and operations in China.

It is possible that world crude-oil production will show some recovery in 1943 though it is improbable that it will return to 1941 levels. Fields destroyed in 1942 will not be returned to anything like normal production this year, despite Japan's claims of success in the Indies. The tanker situation has improved slightly and will doubtless benefit more but this enhancement will hardly be enough to meet the expanding demands of war in addition to civilian requirements so that those areas dependent on marine transportation will still face a deficiency. If the United Nations succeed in driving the Axis completely from North Africa and thereby regain some degree of control of the entire length of the Mediterranean they may ease the transatlantic shipping problem.

Ceilings Hold Most Petroleum Prices

Static Despite Pleas for Relief

by H. Stanley Norman

The advance of 25 cents per barrel on Pennsylvania Grade crude effective March 26 was the only increase authorized in 1942. All other crude-oil prices are unchanged since the last general advance in May 1941. Crude prices for all important producing areas appear on pages 223, 224, and 225 this issue.

THE unyielding weight of federal price ceilings throughout 1942 and continuing this year held petroleum markets, both for crude and products, essentially unchanged at prewar levels. Increases were authorized for Pennsylvania Grade crude oil in the forepart of last year and scattered adjustments elsewhere were sanctioned by the Office of Price Administration but general advances were rejected as regularly as proposed.

This year's outlook is for a more dynamic petroleum market, particularly in the case of crude oil although the administration is committed to an anti-inflation policy which, from the most optimistic viewpoint possible, circumscribes the future with relatively narrow boundaries.

Ceilings on products, particularly in the interior refining districts, also functioned as floors under the market. Unfortunately, the compensating factors did not apply to the eastern or to the Gulf Coast refineries in equal proportions. This inequality of economic factors resulted from the necessity for manufacture of much higher percentages of low-value products by eastern plants than was the case during most of last year at inland refineries.

Equalization in Prospect

National application of motor-fuel rationing probably will have a tendency to place all refiners on a more common footing and as war conditions force production of higher percentages of fuel oil the current maladjustment at eastern plants will apply throughout the country. Consequently, the recent OPA enunciation that higher prices for fuel oil, probably accompanied by lowered ceilings on gasoline very logically may presage future actions. Unknown, of course, is the degree of adjustment and the effective date. A complete swing of regulated petroleum prices to mesh with eastern refinery conditions would, with certain seasonal modifications, subject interior-plant operators to about the same inequalities as have worked against eastern manufacturers in recent months. Certain inequities in the present price regulations have been magnified by the types of crude available to refineries in various parts of the country. Mid-Continent and Middle West crudes yielding up to 50 per cent gasoline under certain refining conditions, for example, are not nearly so amenable to production of 25 to 30 per cent of residual fuel oil as heavier Gulf Coast crudes.

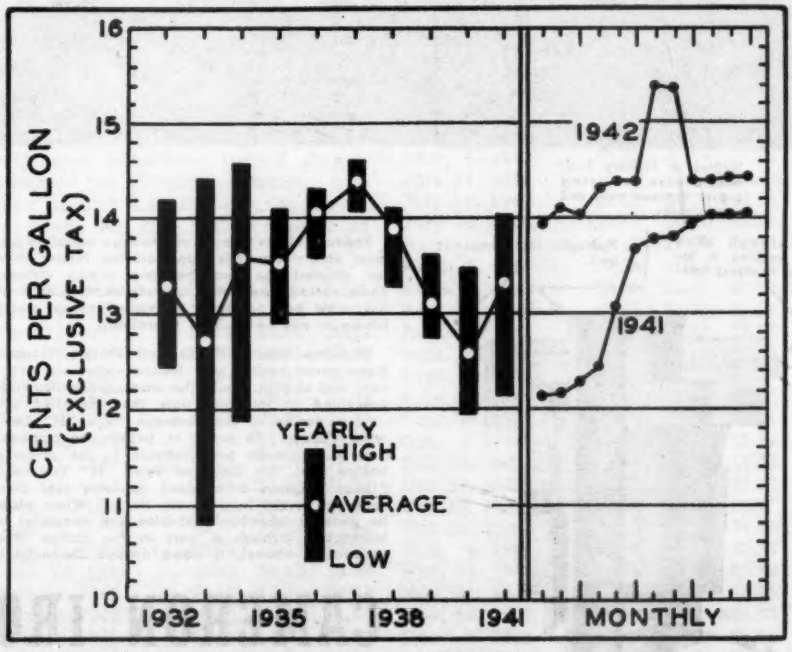
The average service-station price of regular gasoline at 50 representative cities throughout the country in January stood at 20.43 cents per gallon, a slight improvement from the December 1942 figure of 20.41 cents. Previously, in September, October, and November, the 50-city average was reported at 20.36, 20.36, and 20.37 cents per gallon, respectively. The December and January gain of 0.07 cent was caused by the OPA's approval of a 3-cent margin for dealers.

The high service-station prices prevailing in July and August resulted from special OPA concession among East Coast marketers previous to government absorption of the increased transportation costs.

Five Price Cycles

There were five cycles of eastern gasoline prices last year. Advances of 0.3 cent per gallon on January 23; 0.5 cent, March 27; 0.4 cent April 30, and 2.5 cents per gallon June 29 were followed by a reduction of 2.5 cents August 5 when government payment of higher transportation costs became effective. Eastern marketers were permitted to retain 1.2 cents per gallon of the increases granted during the first half of 1942 in order to defray the transportation expenses incurred there by marketers before advances were adjusted to actual shipping conditions.

Service-station prices in other parts of the country are, for all practical purposes, unchanged from the ceil-



How the midyear modification and subsequent tightening of tank-wagon price ceilings influenced the curve on retail gasoline marketing

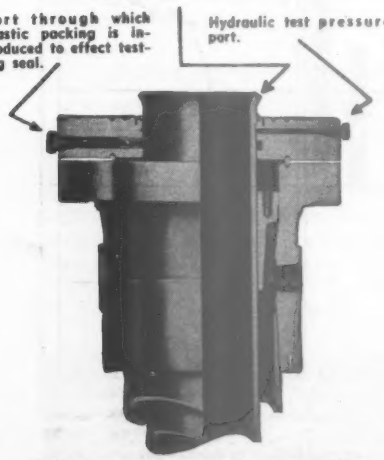
The Surest Way to Make Casing Annular Pressures

"STAY PUT"

CAMERON

Type "M"

TEST-WELD CASING HEADS


Welded or Primary Seal. Note stress relieving groove between weld and ring grooves.
Port through which plastic packing is introduced to effect testing seal.
Hydraulic test pressure port.

Cross-section view of Cameron Casing Head with Type "M" Test-weld Flange. Note that slips are provided for resilient seal assembly which bolts down on top of the slips with socket head cap screws in event a welded seal is not desired.

Because of the danger of pressure equalization, most safety-conscious operators no longer take for granted the seal between casing strings. Their seeing-is-believing attitude concerning casing seals has no doubt prevented many costly blowouts and re-working operations.

Cameron Casing Heads and Testing Flanges have made casing seal testing extremely practical and certain. Study the cross-section drawing presented at left and note the simplified yet unique design of the Cameron Type "M" Test-weld Flange. In order to permit the application of hydraulic test pressure to the primary casing seal, the Cameron Type "M" Test-weld Flange employs a moulded asbestos seal ring recessed in the bore of the flange. When plastic packing (shredded asbestos and graphite) is introduced through a port in the flange (See illustration above), it flows around the outside of this moulded asbestos seal ring and forces it into sealing engagement with the pipe. Thus, the testing or secondary seal may be tightened or repacked at any time subsequent to completion by simply injecting more plastic packing and *without disturbing any part of the casing head hook-up for this operation.*

Cameron Casing Heads employing a resilient seal between casing strings can also be furnished with a test flange, the Type "WM", which is almost identical to the Type "M", flange illustrated herewith. The resilient seal is frequently used where Grade N-80 casing makes field welding impractical.

Complete details on all types of Cameron Casing Heads are carried in your Composite Catalog, or descriptive literature will gladly be sent to interested operators on request.

CAMERON IRON WORKS, INC.

711 MILBY ST., HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y.
California: The Howard Supply Co., Los Angeles
Rocky Mountain: Mountain Sales and Service, Casper, Wyoming

ing-base conditions prevailing in October 1941.

Tank-car prices in all major refining districts, contrary to customary seasonal fluctuations, held approximately level throughout the year. For example, the average tank-car price of regular gasoline in the Mid-Continent (Group 3) territory ranged from a low of 5.4615 in April to a high of 6.25 cents per gallon in January 1942. During the last 4 months of the year, the range was constant at 5.875 to 6 cents per gallon. The fluctuations were even less in other petroleum products than in the case of gasoline.

AVERAGE SERVICE-STATION GASOLINE PRICES

	Dealers' net price (ex. tax)	Total gasoline tax	Service station (inc. tax.)
1943—			
Jan.	$0.1037	$0.0597	$0.2043
1942—			
Dec.	.1037	.0597	.2041
Nov.	.1037	.0597	.2037
Oct.	.1033	.0597	.2036
Sept.	.1033	.0597	.2036
Aug.	.1126	.0597	.2129
July	.1137	.0597	.2136
June	.1038	.0597	.2037
May	.1040	.0597	.2037
April	.1025	.0597	.2026
March	.1010	.0597	.2004
Feb.	.1016	.0597	.2009
Jan.	.0998	.0597	.1991
1941—			
Dec.	.1004	.0595	.2002
Nov.	.1002	.0595	.1999
Oct.	.1004	.0595	.1999
Sept.	.1002	.0595	.1989
Aug.	.1004	.0595	.1982
July	.0994	.0595	.1977
June	.0985	.0595	.1964
May	.0940	.0592	.1903
April	.0878	.0590	.1832
March	.0862	.0590	.1817
Feb.	.0854	.0590	.1808
Jan.	.0854	.0590	.1807

Inability of refiners to advance fuel-oil quotations during the winter season of high consumption was, a comparison of previous market records will show, partially offset by the failure of motor-fuel quotations to sag with the advent of cold weather.

One of the significant trends in petroleum marketing last year and continuing, probably for the duration, was the establishment of specific delivered-price ceilings. Most of the eastern seaboard terminals are now covered by specific ceiling prices on residual fuel oil, ranging from $1.65 at Philadelphia, New York and other North Atlantic ports to $1.85 at northern inland-waterway terminals, such as Albany, N. Y. The last price action of 1942 was an OPA authorized advance of 0.3 cent per gallon on fuel oil by dealers making deliveries in the 30 rationed states. The action was taken to defray additional costs being incurred by dealers as the result of emergency contingencies. Local advances of 0.5 cent per pound on wax on the Pacific Coast, 0.5 cent per gallon on fuel oil in Michigan, 25 cents per barrel on No. 6 and Bunker C fuel oil at Mobile, Ala., and numerous other similar OPA actions were all related to the cost of maintaining service or to increases in transportation charges.

Despite modifications in various localities and the general application of higher gasoline and fuel-oil ceilings in the eastern states, the basic markets of the petroleum industry, frozen by direct order of the OPA on February 2, 1942, remain pegged to the average quotations prevailing October 8, 1941.

Practically all producing elements in the industry have at various times since the start of 1942, appealed to OPA and worked through other bureaus in Washington for higher crude-oil prices. The appeals, in recent months, have been pegged to the failure of discoveries to meet the goal set by the Petroleum Administration for War and to the possibility of a crude-oil shortage within the reasonable near future unless incentives are increased for exploratory drilling.

Meanwhile, refiners look askance at momentum of the movement for higher crude-oil prices, fearing that adjustments in product markets which are most intimately felt by consumers, will bear a disproportionate part of the antiinflation sentiment in government circles.

Crude oil producers have asked for price increases ranging from 25 cents per barrel to a maximum of $1 which some engineers and economists estimate will be required to accomplish the dual purpose of discovering more oil and of expanding secondary-recovery operations. Other analysts declare that an increase of 58 cents per barrel in crude oil is necessary to bring this essential product up to a parity with the general commodity index.

Abandonment of unprofitable retail outlets spread throughout the country with some observers anticipating that approximately 25 per cent of the stations will cease operations by the middle of 1943. Subsequent developments in transportation of petroleum supplies and progress of the synthetic-rubber program will determine whether the mortality rate of service stations goes beyond the present calculations.

Averages On Oil Securities Reflect Anticipated Demand

THE strong war demand for petroleum and the outlook for increased requirements over the next several months were factors in lifting the price of representative securities during the latter months of 1942. Inherent inflationary tendency of a war period may have had some influence but most observers placed greater stress on the forecasts of demand running around 4,200,000 bbl., or higher on crude for the fourth quarter of 1943.

Week ended:	High	Low	Last
Jan. 3, 1942	24.10	22.39	23.29
Jan. 11, 1942	23.92	22.55	22.81
Jan. 17, 1942	24.00	22.61	23.49
Jan. 24, 1942	23.84	23.06	23.50
Jan. 31, 1942	24.15	23.25	23.44
Feb. 7, 1942	23.90	23.25	23.47
Feb. 14, 1942	23.37	22.53	22.81
Feb. 21, 1942	22.87	21.58	21.77
Feb. 28, 1942	22.14	21.37	21.90
Mar. 7, 1942	21.99	20.47	20.67
Mar. 14, 1942	20.77	19.78	19.95
Mar. 21, 1942	20.75	19.63	20.36
Mar. 28, 1942	20.52	20.00	20.16
Apr. 4, 1942	20.53	20.04	20.31
Apr. 11, 1942	20.79	20.02	20.12
Apr. 18, 1942	20.23	19.42	19.57
Apr. 25, 1942	19.90	18.79	18.97
May 2, 1942	19.72	18.69	19.54
May 9, 1942	20.22	19.44	20.14
May 16, 1942	20.34	19.53	19.87
May 23, 1942	20.24	19.59	19.95
May 29, 1942	20.30	19.74	20.09
June 6, 1942	20.88	19.97	20.83
June 13, 1942	21.17	20.53	20.79
June 20, 1942	21.56	20.71	21.14
June 27, 1942	21.06	20.44	20.67
July 4, 1942	21.22	20.54	21.09
July 11, 1942	22.80	21.11	22.48
July 18, 1942	22.87	22.10	22.25
July 25, 1942	22.72	21.97	22.26
Aug. 1, 1942	22.41	21.74	21.99
Aug. 8, 1942	22.24	21.65	21.84
Aug. 15, 1942	22.53	21.66	22.43
Aug. 22, 1942	23.05	22.30	22.84
Aug. 29, 1942	23.07	22.39	22.77
Sept. 5, 1942	23.02	22.53	22.82
Sept. 12, 1942	23.14	22.37	22.58
Sept. 19, 1942	23.07	22.44	22.93
Sept. 26, 1942	23.70	22.80	23.54
Oct. 3, 1942	24.08	23.25	23.99
Oct. 10, 1942	25.56	23.96	25.37
Oct. 17, 1942	25.71	24.76	25.23
Oct. 26, 1942	26.24	25.14	25.87
Oct. 31, 1942	26.05	25.14	25.66
Nov. 7, 1942	26.27	25.37	26.02
Nov. 14, 1942	26.24	25.55	25.78
Nov. 21, 1942	26.09	25.12	25.85
Nov. 28, 1942	26.02	25.27	25.60
Dec. 5, 1942	26.04	25.23	25.65
Dec. 12, 1942	26.01	25.29	25.74
Dec. 19, 1942	26.58	25.42	26.29
Dec. 26, 1942	27.01	26.02	26.81

Condensed Oil-Agency Directory

PETROLEUM ADMINISTRATOR FOR WAR

New Interior Building
Eighteenth and C Streets, N.W.
Phone REpublic 1620

ADMINISTRATOR'S OFFICE

	Rm.	Ph.
Ickes, Harold L., ...	6156	5000

DEPUTY ADMINISTRATOR'S OFFICE

Davies, Ralph K., deputy	6654	3831
Allen, Robert E., assistant	6647	3334
Batzell, E. E., assistant ..	6070	2181
Brown, Bruce K., assistant	6646	2066
DeGolyer, E., assistant ..	7516	4459

PRODUCTION DIVISION

Knowlton, D. R., director.	7410	4861
Schilthuis, R. J., assistant	7410	2907
Gordon, J. E., development	7411	4826
Heston, J. E., production .	7416	4689
Hawthorn, D. G., materials	....	....

REFINING DIVISION

Cumming, E. B., director.	6637	3233
Robinson, P. M., assistant	6644	4786
Bailey, D. P., operations .	3213	4877
Cragin, Robert B., supply.	3218	3237
Miller, M. B., construction	7443	4560
Parkhurst, G. L., facilities	3229	3941

TRANSPORTATION DIVISION

Parten, J. R., director ...	6629	4418
Cowles, L. R., assistant ..	6620	3658
Sears, D. P., pipe-line ...	6626	4833

NATURAL GAS-NATURAL GASOLINE

Poe, E. H., director	7423	4860
Ducker, R. W., natural gas	7423	4774
Lange, W. R., production.	7512	4744
Martin, J. W., liquefied gas	7424	4871
Pew, J. E., natural gasoline	7423	4871
Thacher, J. H., Jr., tech.	....	....

MARKETING DIVISION

Collier, Robert T., director	4257	4646
Best, Paul A., assistant ..	4258	3518
Ellender, J. H., motor fuels	4258	4434
Foulds, Ned F., fuel oil .	4257	4797

LEGAL DIVISION

Marshall, J. H., chief	6649	4100
Jones, John F., production	7415	3298
Leonard, J. H. F., refining	3211	4832
Wolf, Justin R., allocations	6070	2130

MATERIALS DIVISION

Watts, F. A., director	7314	4585
Bell, R. R., export section	7322	2796

PETROLEUM SUPPLY DIVISION

Minckler, R. L., director.	7450	4834
Saver, R. C., assistant ...	7450	2083

FACILITY SECURITY DIVISION

Mason, W. D., director ..	3641	4172

FOREIGN DIVISION

Duce, James T., director .	4442	4417

INFORMATION DIVISION

Yocom, H. A., director ..	7513	3844

DIVISION OF RESERVES

Heroy, W. B., director ...	7514	4459

RESEARCH DIVISION

Swanson, E. B., director .	7315	649

DISTRICT 1

122 East Forty-second St.,
1104 Chanin Building, New York City

Director in charge—Charles L. Harding.

Transportation Division—William C. Eberle, director.

Marketing Division—Laurence B. Davis, director.

Materials Division—Rawlston M. Dinges, director.

Facility Security Division — Frank Epps, director.

Foreign Division—Emerson M. Butterworth, special representative.

Legal Division—Charles L. Harding, counsel.

Pittsburgh Suboffice

706 Benedum-Trees Building,
223 Fourth Ave., Pittsburgh, Pa.

Production Division—James R. Wylie, Jr., director; Henry W. Fuellhart, assistant.

Natural-Gas and Natural-Gasoline Division—Frank Brewster, director; Virgil F. Boyer, assistant, and Robert S. Hyde, analyst.

DISTRICT 2

1200 Blum Building,
624 South Michigan Ave., Chicago, Ill.

Director in Charge—Wirt Franklin, also director of production.

Alternate Director in Charge—Harold L. Wadsworth, also assistant director of production.

Production Division—Messrs. Franklin and Wadsworth, Chicago; Garvin D. Chastain, Mount Pleasant, Mich.; Joseph E. Washington, Mount Vernon, Ill.

Transportation Division—Walter DuMont, director, and Paul J. Bond, assistant.

Legal Division—Charles K. Schwartz, counsel.

Materials Division—L. B. Holland, acting director.

Natural-Gas and Natural-Gasoline Division—Seth W. Herndon, director.

Reserves Division—Frank P. Donohue, conservation engineer.

Marketing Division—Carroll W. Johnson, director; E. L. Hughes, chief, fuel oils section; E. F. Undersood, chief, facilities section.

Facility Security Division—E. J. Bullock, director; Charles P. Holmes, specialist.

Tulsa Suboffice

410 Beacon Building, Tulsa

Production Division — Charley C. Brown, assistant district director.

Natural-Gas and Natural-Gasoline Division—Mark S. Patton, assistant district director.

Materials Division—S. R. Clinkscales, materials specialist.

Facility Security Division—George J. Collins, specialist.

DISTRICT 3

245 Mellie Esperson Building,
Houston, Tex.

Director in Charge — Darst E. Buchanan.

Production Division—E. O. Buck, district, director.

Natural-Gas and Natural-Gasoline Division—Darst E. Buchanan, chief.

Refining Division—Gordon T. Granger, district director; Frank W. Hall, special refining consultant.

Materials Division—Frank L. Hereford, distrct director; C. Edward Naylor, senior materials specialist.

Marketing Division—David G. Gray, district director.

Legal Division—John P. Rice, district counsel.

Transportation Division—William M. Averill, district director.

Conservation Division—John H. Murrell, conservation engineer; William J. Murray, Jr., conservation engineer.

DISTRICT 4

320 First National Bank Building,
Denver, Colo.

Director in Charge—Michael J. Foley, also director of production.

Petroleum Reserves Division — John R. Fanshawe, II, district geologist.

Materials Division—John B. Schuyler, director.

Marketing Division—Herbert T. Rapp, director.

Natural-Gas and Natural-Gasoline Division—Albert M. Ballard, analyst.

DISTRICT 5

855 Subway Building,
Los Angeles, Calif.

Alternate Director in Charge — Charles B. Garretson.

Production Division—Eugene L. Davis, chief, production section; Edmund Jussen, chief, development section.

Natural-Gas and Natural-Gasoline Division—Kenyon L. Reynolds, director.

Marketing Division—Charles B. Garretson, director; Homer E. Britzman, assistant director.

Facility Security Division—Allen A. Jergins, director at large; George F. Prussing, district director.

Conservation Division — Everett G. Trostal, engineer.

Transportation Division—S. Dale Gibson, acting director.

Legal Division — Clyde Thomas, district counsel.

Refining Division—Malcolm P. Youker, director.

Materials Division—Charles T. Reichert, director.

A Report on The Steel Valve Outlook

"What's the 1943 delivery picture for steel valves?"
"How can I get quicker shipment?"
"How long am I going to be able to get repair parts?"
"How will valve material substitutions affect me?"

Culled from the mail, these are the kind of questions which prompt this simple, straightforward report on the wartime activities of The Edward Valve & Mfg. Co., Inc.

Here are the facts.

What About Deliveries?

War needs for steel valves have, of course, increased during the past year. Nevertheless we have tried not to bite off more than we can chew. We have tried to set delivery schedules based on facts, not hopes.

Since critical materials are used in the manufacture of steel valves, limitation orders, directives and revised preference ratings have occasionally resulted in minor delivery changes, but *on the whole, we have been ahead of schedule throughout the past year.*

During 1943 we intend to follow a similar policy. We are serious about keeping or bettering delivery promises.

How About Repair Parts?

When a valve user orders a repair part he usually needs it in a hurry. Therefore we put particular emphasis on delivering parts quickly. *At the close of 1942 there was not a single past due repair part order on our books.*

Orders for maintenance parts are naturally increasing since old equipment must last for the duration in many plants. To help keep these plants running we will continue to give preferred treatment to repair part orders, within the limitations of government regulations, of course.

Simplification Cuts Inventories, Speeds Shipment

The war has brought much voluntary valve standardization and simplification. The user, the distributor and the manufacturer are all gainers.

For years Edward engineers have designed for maximum part interchangeability. As a result, *Edward users today need only small inventories of replacement parts.* The new Edward INTEX valves are a case in point. Only a few simple tools are required for maintenance, and parts are unusually accessible and highly interchangeable. Inexperienced men and women can maintain and operate Edward valves.

Equally important, elimination of "specials" makes possible quantity manufacturing and speeds deliveries. Stick with the standard and you'll get your valves much quicker.

Certain valve types and pressure groupings have been discontinued to free additional war production capacity, but *Edward still builds a complete line of steel valves for all land and marine service temperature and pressure conditions.* Edward sales representatives are experienced valve engineers. Edward valves are also available through leading industrial distributors the country over, with the full assistance of factory engineering and sales staffs at their disposal.

War Materials and War Workmanship

The materials going into Edward valves today are just as good or better than before the war. Actually, very few material substitutions have been required.

Edward workmanship standards, too, are unchanged. Naturally, with a greatly expanded personnel new supervisors have been created, but virtually every new department head or foreman has been promoted from the ranks where he has had imbued in him the Edward principles of closely controlled workmanship. The addition of much new precision equipment makes adherence to Edward standards even more certain.

Post-War Plans

In the Edward laboratories and design departments, an uninterrupted development program is carried on, pointing the way to new refinements, new products, and new post-war applications.

Since our plant is occupied entirely with the manufacture of standard Edward steel valves there need be no time out after the war for reconversion to peace-time valve production. Further, the Company is a closely integrated organization—a single unit complete in one location—making it relatively easy to change to meet changing conditions, yet making possible rigid quality control.

* * *

The only thing certain about the future is that it will be full of change. Undoubtedly many of your problems and ours will be mutual ones. And whether we are able to meet your valve needs or not, we'll be happy indeed to work with you on any matters concerning the procurement, use, maintenance or development of cast and forged steel valves.

W. F. Crawford
President

The Edward Valve & Mfg. Co., Inc.

Cast and Forged Steel Valves — East Chicago Indiana

Chronology of Important

FEDERAL OIL REGULATIONS

PRODUCTION

January

8. Committee of nine authorized by PIWC to study ways and means of increasing reserves.
17. Formation of National Conference of State Regulatory Authorities announced by OPC.

February

2. O'Mahoney introduces bill providing for flat 12.5 per cent royalty on public lands.
3. Senate passes bill making Connally hot-oil law permanent.
18. OPC issues Amendment 3 to M-68, clarifying well-spacing provisions.

March

3. Secretary Morgenthau urges elimination of depletion allowance and provision for charging off intangible drilling costs from income-tax laws.
19. OPC changes basis for monthly recommended production rates to include "all petroleum liquids."

April

14. National Conference of State Regulatory Authorities holds initial meeting at Interior Department. Hiram Dow, New Mexico, named chairman.
21. OPC issues Recommendation 47, prohibiting "premature" abandonment of wells.

June

22. President Roosevelt signs bill making Connally law permanent.

July

8. Senate commerce committee approves bill for pipe line and barge canal across Florida, along with amendment providing for elimination of M-68's spacing restrictions.
10. Conference of State Regulatory Authorities urges revocation of OPC's Recommendation 47.
14. PIWC production committee asks abolition of all restrictions on exploratory wells.

August

10. Depletion allowance defended by oil-states congressmen, other witnesses, at Senate finance committee hearings.
31. WPB relaxes well-spacing provisions of M-68 in Illinois, southwestern Indiana and northwestern Kentucky. New order good only until December 31 (M-68-5).

September

1. Senate finance committee votes to leave depletion allowance unchanged.
17. Treasury Secretary Morgenthau, at press conference, says he's disappointed at Congress' failure to eliminate depletion allowance as "tax loophole."

October

6. PIWC passes resolution asking higher prices for oil from well to consumer, and at same time asks that more materials be made available for wildcatting.
7. WPB issues M-68-3, permitting closer spacing than provided by M-68 in certain California fields.
12. OPC officials tell O'Mahoney committee that 13,000 wells were not drilled in 1942 because of inability to get steel.
21. O'Mahoney subcommittee recommends that RFC finance exploratory drilling, and that government activities concerning oil be coordinated.
28. OPA lifts price ceilings on drilling of oil and gas wells, and the extinguishing of oil-field fires.

November

11. Ickes announces that idle surplus stocks of oil-industry tubular goods will be redistributed as soon as inventory reports are filed by 10,000 oil and gas producers.
11. PIWC recommends amendments to spacing order (M-68) permitting recompletion and conditioning of existing wells, regardless of spacing pattern.

TRANSPORTATION

February

9. War Shipping Administration set up, with sweeping powers over all ocean shipping.
9. OPC formulates plan for equitable sharing of tank-car and other transportation costs by Pacific Northwest industry (Recommendation 35).
17. Ickes appears before Cole committee to urge 24-in. pipe-line from East Texas to New York.
18. Ickes issues Recommendation 36, calling for tanker sharing on East Coast shipments.

March

10. C. H. Kunze, Socony-Vacuum, named chairman of tanker management subcommittee to supervise pooling.
21. Maritime Commission awards contracts for 26 new tankers.
25. Maritime Commission orders 56 more tankers.
27. OPC issues directive to oil companies in Districts 1, 2 and 3, ordering change of refinery yields, speeding up of tank-car movement, eliminating hauls of less than 100 miles by tank car, etc.

April

6. J. R. Parten named OPC director of transportation.
24. ODT announces railroads have agreed to remove the empty-mileage penalty in effort to boost tank-car movement to East.
27. Representative Mansfield (Texas) introduces bill (H.R. 6999) providing for pipe line and barge canal across Florida.
30. Twenty-six oil-industry executives meet with OPC to make plans for getting 14,000 more tank cars into the eastern service; estimate that 14,000 additional cars, besides the 44,000 already in use, will bring eastern shipments to 800,000 bbl. daily.

May

1. Ickes releases letter disapproving "Tapco" pipe line.
5. Eastman issues General Order 7 setting up machinery for tank-car-control program.
11. Ickes issues Directive 50, setting up joint tank-car subcommittee with authority to requisition for East Coast service.
12. OPC approves nine-point pipe-line program, including relaying some lines, reversals of others, to carry oil to East.
18. House rivers and harbors committee opens hearings on plan to construct pipe line, barge canal, across Florida.

June

3. Dr. George Stocking, OPA fuel chief, promises PIWC some sort of relief from deficit of East Coast transportation "pool" formed by oil companies.
11. Oil-industry officials meet with OPC to determine who will operate 550-mile, 24-in. pipe line, approved today.
12. RFC to finance big pipe line from Longview, Tex., to Norris, Ill., Jesse Jones says.
17. Ickes announces OPC approval of 220-mile, trans-Florida pipe line, using American Liberty line's second-hand pipe.
23. War Emergency Pipeline set up, with W. A. Jones as president, to build new 24-in. line.
28. OPA permits price advances on gasoline and fuel oil in East to wipe out deficits of "transportation pool."

July

7. WPB approves "seven-point" pipe-

line program advanced by OPC, including use of second-hand pipe, relaying of some lines, reversals of others.
7. Defense Plant Corp. agrees to purchase American Liberty 8-in. line from Longview to Houston, Tex., and re-lay it across Florida.
8. Senate committee approves bill for pipe line and barge canal across Florida, along with amendment providing for elimination of M-68's spacing restrictions.
15. Jesse Jones announces that Defense Supplies Corp., RFC subsidiary, will aid in financing losses now being borne by industry in shipments East.
16. PIWC names 12-man committee to study oil-transportation costs; John D. Gill, chairman.
16. PIWC urges WPB to authorize extension to East of 550-mile Longview-Norris City pipe line.
23. Tank trucks removed from ODT truck conservation orders.
23. President Roosevelt signs Florida pipe-line and barge-canal bill, containing provision for crude line from Tinsley, Miss., to Charleston, S. C.
29. OPC files application with WPB for steel to continue "Big Inch" line to East.

August

3. Ickes announces start of pipe-laying on 24-in. line from East Texas to Norris City, Ill.
21. Tank-car shipment of gasoline banned in 20 states of the Southwest and Midwest by OPC.
24. OPC approved a government-financed $3,000,000 extension of the Plantation Pipe Line from Greensboro, N. C., to Richmond, Va., and construction of a 100-mile pipe line across Ohio from Fostoria to Akron.

September

1. Reconstruction Finance Corp. announces how it will compensate oil companies for war-added costs of (1) using abnormal transportation facilities to supply the eastern seaboard, and (2) buying in the Midwest at higher prices than at the Gulf.
3. PIWC urges extension of ban on short hauls by tank car in Districts 1, 2 and 3, to force greater use of trucks up to 100-150 miles.
8. Ickes says work will begin on trans-Florida pipe line about October 1.
8. ODT bans use of tank cars on hauls up to 200 miles.
14. RFC announces it will finance 175-mile extension of Plantation line from Greensboro, N. C., to Richmond, Va.
19. Eastern deliveries by rail hit year's peak of 856,710 bbl. daily, week ended today.
24. WPB orders ODT to set up a system of priorities on tank cars, to increase their use in eastern petroleum service, as well as to provide some cars for service in carrying war-essential chemicals.

October

5. ODT orders routes for moving solid trainloads of petroleum to East reduced from 139 to 60.
21. OPC announces that 'Big Inch" is halfway completed.
27. WPB agrees to permit use of steel to continue 24-in. pipe line eastward from Norris City, Ill.
28. Ickes says he will ask for second pipe line from producing areas to the East, for products.
28. OPC establishes minimum specifications for products moving into or produced in the East, as part of product pooling program.

November

3. ODT names committee to investigate maintenance facilities and practices as regard tank cars. A. V. Bourque named chairman of committee.
13. Ickes announces that second "leg" of the 24-in. line from Norris City, Ill., to the East, will begin this month.

REFINING

March

27. OPC issues directive to oil companies in Districts 1, 2 and 3, ordering change of refinery yields, speeding up of tank-car movement, eliminating hauls of less than 100 miles by tank car, etc. Directive aimed at providing more industrial fuels for East.

April

1. OPC authorized (by Recommendation 43) appointment of a supply and distribution committee in District 3 to arrange for sale, loan, transportation or storage of petroleum and products among Gulf Coast refiners.
27. OPC Recommendation 45, issued today, prohibits use of asphaltic products on streets and highways in District 1, except as approved by Public Roads Administration.

May

4. Davies wires 112 Gulf Coast refineries requesting cut in runs to 70.5 per cent of rate for last 6 months of 1941.

July

30. Ickes announces that "quick butadiene" capacity of more than 200,000 tons a year will be ready by January.

August

3. Gary resigns as OPC director of refining, to become president of Filtrol Corp.
14. OPC issued Recommendation 41, providing for crosslicensing agreements among refiners to speed up manufacture of aviation gasoline, toluene and other war requirements.
29. WPB announces aromatic petroleum solvents other than benzene and toluene will go under complete allocation on October 1.

October

5. Nation-wide restrictions of asphalt and products, tar and products, for paving uses order by OPC.
12. WPB order restricts petroleum coke use to war purposes only, with certain exceptions.

November

17. Mineral oil polymers put under allocation control.

MARKETING

March

3. PIWC recommends nation-wide closing of service stations from 7 p.m. to 7 a.m. daily.
9. Robert L. Minckler named head of OPC's newly formed Division of Petroleum Supply.
5. Ickes recommends pooling of products in Districts 2, 3 and 4, similar to that already in effect in Districts 1 and 5.
14. Limitation Order L-70 issued, curtailing eastern service-station deliveries by 20 per cent.
21. Amendment 1 to Conservation Order M-68-c signed, covering purchase of marketing equipment.

April

9. Order issued, effective April 16, reducing by 33⅓ per cent gasoline deliveries to service stations and bulk consumers.

July

10. Fuel-oil delivery restrictions in Pacific Northwest lifted.
20. Curtailed deliveries to service stations in East abolished as of July 22, when rationing becomes effective.

August

5. Ickes, in nation-wide broadcast, urges eastern fuel-oil consumers to convert to coal.

September

8. New "fuel-rationing division" set up in OPA, headed by Joel Dean, formerly chief of gasoline rationing.
16. OPA announces fuel-oil rationing in 30 eastern and midwestern states will start about October 15, but will cover all oil used after October 1.
25. OPA announces that fuel-oil rationing will seek over-all cut of 33⅓ per cent of normal consumption.

October

7. PIWC resolutions asks elimination of retail credit sales.
20. OPA issues Ration Order 11, describing mechanics of fuel-oil rationing.
28. OPC establishes minimum specifications for products moving into or produced in East, as part of product-pooling program.

November

9. OPA issues regulations for nation-wide gasoline rationing.
10. Supplementary Directive 1-Q, issued by WPB, gives OPA blanket authority over mileage rationing. At the same time, nation-wide mileage rationing deferred to December 1.
17. M-68-c revised to permit oil marketers wider latitude.

GOVERNMENT AND INDUSTRY RELATIONS

January

27. OPA gets authority from WPB for rationing all goods and commodities sold on the retail market.

February

4. Petroleum Industry Council for National Defense officially changes name to Petroleum Industry War Council.

4. PIWC names committee on protection of petroleum facilities, with W. S. Farish as chairman.
11. S. B. Eckert, Sun Oil Co., named chairman of District 1 committee on supplies and distribution (pooling).

March

10. R. Otis McClintock, Tulsa banker, named liaison officer between WPB, OPC and industrial plants financed by RFC.

April

30. Official name of OPC changed to "Office of Petroleum Coordinator for War"; it was ". . . for Defense" before.

May

11. Senate confirms nomination of Rep. William P. Cole, Jr., long-time chairman of House oil subcommittee, as judge of U. S. Customs Court.
11. American Petroleum Institute and Society of Automotive Engineers set up Cooperative Research Council.

June

1. Senator Connally, Texas, introduces bill to set up War Petroleum Corp., with capital of $500,000,000 and authority to buy, sell, make loans on and subsidize excess transportation costs of petroleum and products.
4. Congress passes small business bill suspending antitrust laws, where approved by WPB.
11. President signs antitrust suspension bill.
18. E. L. DeGolyer named an assistant deputy petroleum coordinator.

July

11. Bruce K. Brown made an assistant deputy petroleum coordinator.
16. PIWC opposes Connally "War Petroleum Corp." bill.
25. Meeting of heads of government agencies urges centralization of oil control.
29. Selective Service Director Hershey lists oil industry occupations "essential to the war effort" and hence subject to deferment.

September

3. Oil Administrator Ickes indicates he favors one-man oil control.
7. President Roosevelt's letter to Senator Lodge, (Mass.), saying he favors unified oil control, made public.
22. Representative Cole makes report on state of oil industry on retirement from Congress to take federal judgeship. Recommends institution of one-man control over Government's oil activities, increased crude prices.

November

11. PIWC recommends 48-hour week in petroleum industry.
29. W. S. Farish, president of the Standard Oil Co. (New Jersey), dies.

December

2. President issues executive order appointing Ickes petroleum administrator for war.

MATERIALS

January

5. W. F. Hufi named director of new OPC Materials Division.
13. M-68-c, limiting use of marketing equipment, signed.
13. General Priorities Order P-98, establishing ratings for purchase of oil industry materials and equipment, signed.
25. Order P-98-a issued covering materials priorities for foreign operations.

February

21. Countersignature provisions of P-98 eased by Amendment 1 made public today.

March

3. Priorities Order P-98 extended to March 15.
14. Order P-98 extended to May 15 with slight amendments. Priority ratings remain unchanged.

June

30. Order P-98 extended by WPB to July 31.

July

15. Petroleum machinery section of WPB transferred to OPC.

August

13. Order P-98 (which expired July 31) reissued in same form until September 15.

September

15. Revised Priorities Order P-98-b issued by WPB, proving higher priority ratings for oil-industry equipment.

October

6. PIWC passes resolution asking higher prices for oil from well to consumer, and at same time asks that more material be made available for wildcatting.
12. OPC officials tell O'Mahoney committee that 13,000 wells were not drilled in 1942 because of inability to get steel.

November

11. WPB announces that top priority rating of AA-1 is available for essential maintenance and repair in the oil industry.
17. M-68-C revised to permit oil marketers wider latitude.

RUBBER AND GASOLINE RATIONING

January

8. Ickes tells press conference rubber shortage will cause enough voluntary reductions in driving to preclude necessity for western gasoline rationing.

February

19. Ickes tells press he foresees possibility of national gasoline rationing.

March

5. Henderson tells Senate defense committee there may be nation-wide gasoline rationing to save tires.
14. President Roosevelt asks governors of states to establish 40-mile speed limits, institute compulsory tire inspections, as rubber conservation measures.

April

1. W. S. Farish, president of Standard Oil Co. (New Jersey), appears before Truman committee to explain company's position on synthetic rubber. Said Standard's data had been made available to Government.
2. RFC Chief Justice Jones announces synthetic-rubber program to be participated in by 15 oil companies.
9. W. S. S. Rodgers, president of the Texas Co., named chairman of PIWC's special committee on synthetic rubber.
23. Henderson announces gasoline rationing for East beginning May 15.

May

11. WPB issues Supplementary Directive 1-H, giving OPA formal authority to ration gasoline in East.
12. OPA issues Ration Order 5 governing gasoline rationing in East.

June

12. Roosevelt announces oil industry's scrap-rubber drive.
16. William R. Boyd, Jr., chairman of PIWC, announces nation-wide organization of industry for scrap-rubber drive.
25. Senate agriculture committee favorably reports Gillette bill.

July

14. Donald Nelson tells Gillette committee WPB plans to go ahead with rubber-from-petroleum program.
15. W. S. Farish tells House committee tires for civilian use could be made available with synthetic rubber in 3 or 4 months, but warns motorists against undue optimism.
15. Commerce Secretary Jones tells Senate committee there has been no discrimination against any particular process in setting up synthetic-rubber program; petroleum was only raw material supply which appeared to be readily available when program adopted, he asserts.
21. White House announced that petroleum industry collected 454,155 tons of scrap rubber during recent drive.
22. Senate passes Gillette bill providing for special agency to handle synthetic rubber made from farm alcohol.
24. House passes Gillette bill.
30. Ickes announces that "quick butadiene" capacity of more than 200,000 tons a year will be ready by January 1.

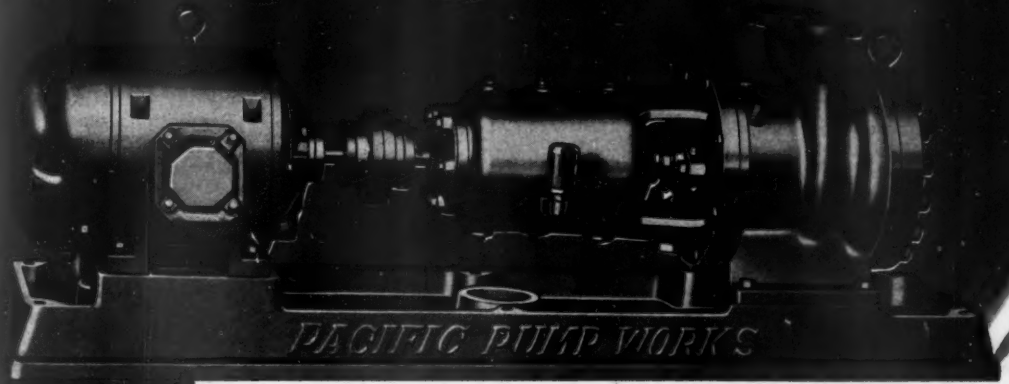
August

4. President announces he will veto Gillette "rubber from alcohol" measure.
7. William S. Farish charges Senate patents committee is conducting "smear campaign" against his company on I. G. patents.
10. Davies warns of possibility of gasoline rationing in Midwest.
12. Joel Dean, chief of fuel-oil rationing for OPA, discusses rationing plan with eastern distributors.

September

10. Baruch rubber committee report issued, recommending nation-wide gasoline rationing to conserve rubber, national 35-m.p.h. speed limit, expansion of synthetic-rubber capacity.
15. Appointment of William M. Jeffers

pumping universe



One bright star always stands out in any constellation. Its brilliance may be due to many things but there it is—*outstanding*.

What makes a pump outstanding? Pacific *engineered* Pumps, because of their consistent, brilliant performance, are conceded to be right in the center of the pumping universe.

In addition to their reasonable installation cost, low maintenance expense and long service records made under tough pumping conditions, you will find the correct, specialized design that enables you to meet every variable in your particular pumping requirements. Pioneered features such as double-case design, corrosion-resistant, hardened-metal combinations and mechanical floating seals give you the assurance that your Pacific Pumps will be the star performers in your pumping service—for many years to come.

Put Pacific to work—on your pumping problems!

PACIFIC PUMP WORKS
HUNTINGTON PARK CALIF.

PACIFIC PUMP WORKS

Executive Offices and Plant: Huntington Park, California
Export Office: 30 Rockefeller Plaza, New York City, New York
Sales and Service: Offices in Principal Cities in the United States

PACIFIC *Engineered* PUMPS

as "rubber czar" announced by White House.

26. ODT orders national 35-m.p.h. limit for all vehicles except common carriers on regular routes, effective October 1.

October

13. Automobiles with more than five tires won't be eligible for gasoline ration cards, OPA announces. Surplus tires must be sold to the Government.

November

9. OPA issues regulations for nation-wide gasoline rationing.

10. PIWC orders test of tubeless tires.

10. Supplementary Directive 1-Q issued by WPB, gives OPA blanket authority over mileage rationing. At the same time, nation-wide mileage rationing deferred to December 1.

12. House members plan formation of group to oppose nation-wide rationing.

19. Unofficial group of midwestern congressmen call for 90-day postponement of nation-wide rationing.

23. Senator Truman, chairman of the National Defense Investigation Committee, says the committee will hear proponents of nation-wide rationing November 27.

24. Representative Sumners (Texas) urges before Cole committee that people be given a chance to cut gasoline consumption voluntarily.

December

1. Tubeless tires demonstrated before House oil committee.

EAST COAST SUPPLY

January

29. Ickes tells press conference East Coast situation "tighter than before."

February

9. OPC asks eastern suppliers to build up stocks of heavy fuel.

9. OPC issues Recommendation 33, providing for pooling of products in the East.

20. Ickes approves plan for systematizing East Coast fuel-oil deliveries. Plan provided that no marketer shall deliver oil for uses other than domestic heating if customer's stock on hand is more than 14 days' supply.

March

5. Committee from PIWC meets with OPA officials to urge price increase for products on East Coast.

17. Ickes meets with oil and coal industry representatives to discuss critical-fuel situation in New England.

24. General committees of Districts 1, 2 and 3 meet in Washington to discuss methods of increasing oil transportation to East.

April

9. Order issued, effective April 16, reducing by 33⅓ per cent gasoline deliveries to service stations and bulk consumers in 17 eastern states, District of Columbia, Oregon and Washington. (Limitation Order L-70). Order also provides service stations must post hours of opening, closing.

May

1. Oil industry representatives meet with coordinator's office in effort to make plans to boost eastern oil movement to 800,000 bbl. a day by tank car. Refinery-control plans discussed.

5. Dr. R. E. Wilson, chairman of PIWC economics committee, sees breakdown among East Coast oil companies unless price adjustments made.

11. Ickes issues Directive 50, setting up joint tank-car subcommittee with authority to requisition cars for East Coast service.

June

4. Special WPB committee named to confer with OPC and Maritime Commission on East Coast supplies and OPC pipe-line recommendations.

16. Ickes urges eastern home owners to convert to coal.

July

1. Eastern oil executives meet with OPA rationing officials to hear plans for nation-wide permanent rationing beginning July 22.

16. PIWC names 12-man committee to study oil-transportation costs; John D. Gill, chairman.

29. WPB order prohibits use of fuel oil for heating between August 3 and September 15, to give dealers opportunity to build up stocks.

August

26. Special WPB committee studying eastern fuel-oil situation holds first meeting. Members: Davies, Henderson and Undersecretary of War Patterson.

October

5. L. T. Kittinger named to head new East Coast supply pool.

20. OPA issues Ration Order 11, describing mechanics of fuel-oil rationing.

November

12. Ickes says a 12 per cent over-all cut in East Coast oil consumption will be asked to free oil for North African forces.

PRICES

January

19. OPA sets up formula for determining oil prices under "freeze" letter of November 7.

30. President signs Emergency Price Control Act of 1942, with Leon Henderson as administrator.

February

4. OPA issues Price Schedule 88 freezing oil prices at October 1, 1941, levels.

25. Deputy Coordinator Davies and Dr. R. E. Wilson of Pan American urge price adjustments for industry to offset added costs due to war, before Cole Committee.

March

5. Committee from PIWC meets with OPA officials to urge price increase for products on East Coast.

7. Aviation-gasoline prices exempted from ceilings under Schedule 88.

18. OPA freezes Pacific Coast service-station prices at March 13 levels.

21. OPA denies request for 10-cent increase in Texas Panhandle crude.

25. OPA grants 25-cent increase in Pennsylvania Grade crude.

25. OPA authorizes increases in gasoline and fuel-oil prices in East.

April

6. OPA issues Amendment 5 to Price Schedule 88, providing for establishment of crude-price ceilings at wells completed or reopened since October 1, 1941, "ceiling" price date.

7. OPA permits gasoline retailers in East, and in Oregon and Washington, to charge a full 3-cent margin.

May

8. Henderson tells Cole committee a price subsidy to relieve higher industry costs is a "last ditch" alternative.

21. Dr. John D. Gill, chairman, and other members named to PIWC's cost and price-adjustment committee.

June

28. OPA permits price advances on gasoline and fuel oil in East to wipe out deficits of "transportation pool."

July

6. Senator Guffey (Pennsylvania) introduces bill to turn oil-price and rationing functions of OPA over to OPC.

October

1. Maximum prices for wet and dry natural gas, formerly subject to provisions of General Maximum Price Regulation, placed under provisions of Price Schedule 88.

9. Henderson tells O'Mahoney committee he sees "no reason for a general increase" in crude prices.

22. Representative Cole on retirement recommends increased crude prices.

NATURAL GAS

February

12. Order M-68-1 issued, relaxing drilling restrictions on natural-gas wells in New York, Pennsylvania, West Virginia, Ohio and Kentucky.

April

8. WPB issues Limitation Order L-86, prohibiting installation of new equipment to contain, distribute or dispense liquefied petroleum gas.

June

20. Supplementary Order M-68-2 announced, permitting drilling of gas wells on 40-acre tracts in Missouri and parts of Oklahoma and Texas. Previous spacing provided for one well to 640 acres.

September

3. WPB halts drilling in Hugoton gas field, after being told by Davies that many recently drilled wells are not producing because they have no pipeline connections.

October

16. WPB announces all furnace-type carbon black will go under complete allocation control November 1.

FOREIGN

April

1. George S. Walden, Standard-Vacuum, named chairman of foreign operating committee set up under OPC Recommendation 38 to represent companies with foreign holdings.

May

21. Exports excluded from M-68 and M-68-c orders.

Ellenburger and Clear Fork Provide Important Discoveries in Basin

by Harry F. Simons

DEVELOPMENT of Ordovician pays and the increasing importance of the Clear Fork lime of the Permian age were the principal interests during 1942 in the Permian basin and indicate the trend for the coming year. Two new Ellenburger pools, Monahans in Ward County and Embar-Ellenburger in Andrews County, gave some indication of the deeper possibilities in the area. The major Clear Fork discovery was the Fullerton pool in Andrews County. This pool had 10 wells at the end of the year with 6,479 bbl. daily potential. The Embar-Permian in the same county was also a Clear Fork discovery and the Monahans-Permian in Ward County produced from the same formation.

In the annual review of the principal producing areas, tables are presented showing 1942 production, cumulative production to date, and estimated reserves as of January 1, 1943. These are all in thousands of barrels.

The Fullerton pool was discovered by the Fullerton Oil Co. 1 Wilson, NE SW SE Section 15, Block A-32, Public School Land Survey, 15 miles northwest of the town of Andrews, which was completed February 3 at plug-back depth of 7,280 ft. The well had originally been drilled to 8,005 ft. in lime but was plugged back to the saturated section in the Clear Fork. On completion it made 707 bbl. fluid through 1-in. choke; the oil was 44 gravity.

While 10 wells have been drilled in the pool the most remote one is only a mile distant from the discovery. So far the pool has not been outlined and there are no dry holes. Wells have averaged better than 600 bbl. initial The pay zone runs from 150 to 500 ft. in thickness, the later wells penetrating that much section. The two last wells completed have been the largest in the pool, the highest initial being 1,790 bbl.

The pool bids strongly to become a major pool in the Permian basin. More significant is the fact that it may establish another trend lying between the two lines of major devel

PRODUCTION AND RESERVES—WEST TEXAS

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Barnhart	112	126	18,374	9
Big Lake	1,880	99,302	39,998	200
Cedar Lake	314	660	12,940	51
Cowden-Foster	6,917	45,584	168,916	1,416
North Cowden	*3,058*	*24,097*	*90,903*	*539*
South Cowden	*603*	*2,812*	*14,188*	*116*
Emma	*290*	*1,258*	*6,742*	*61*
Foster	*2,276*	*15,560*	*42,440*	*575*
Johnson	*690*	*1,857*	*14,643*	*125*
Fuhrman-Deep Rock	339	4,150	22,290	84
Fullerton	112	112	4,208	9
Goldsmith-Harper	7,267	45,534	334,556	1,161
Goldsmith and North	*6,569*	*37,484*	*287,526*	*957*
Embar-West Andrews	*157*	*176*	*16,404*	*20*
Harper	*541*	*7,874*	*30,626*	*184*
Hendrick-Kermit	8,417	266,277	196,273	1,916
Eaves	*153*	*714*	*2,186*	*7*
Emperor	*486*	*3,772*	*9,228*	*119*
Halley	*54*	*636*	*4,764*	*25*
Henderson	*1,112*	*6,612*	*16,888*	*138*
Hendrick	*2,532*	*203,955*	*29,045*	*304*
Kermit	*1,720*	*30,346*	*81,404*	*819*
Keystone	*1,719*	*9,246*	*44,754*	*362*
Leck	*160*	*3,913*	*3,087*	*9*
Scarborough	*451*	*7,083*	*4,917*	*133*
Howard-Glasscock	4,812	104,829	48,171	822
Iatan-Snyder	1,727	17,459	31,901	411
McCamey	3,322	60,951	49,469	967
McCamey	*3,099*	*54,653*	*43,847*	*851*
Cowden-Crane	*192*	*5,941*	*4,059*	*100*
Miscellaneous	*31*	*357*	*1,563*	*16*
McElroy	4,916	126,371	110,229	595
Mears	707	6,071	60,879	122
Pecos Valley	1,869	13,493	73,698	626
Abell	*804*	*998*	*38,002*	*96*
Apco	*111*	*263*	*13,537*	*21*
Lehn	*92*	*379*	*1,821*	*50*
Payton	*330*	*2,869*	*5,131*	*123*
Pecos Valley	*302*	*2,670*	*6,930*	*173*
Shearer	*180*	*1,190*	*2,610*	*43*
Walker	*243*	*3,640*	*3,241*	*63*
Miscellaneous	*107*	*1,484*	*2,426*	*57*
Penwell-Jordan	2,790	33,765	132,745	514
Dune	*113*	*568*	*10,232*	*26*
Jordan	*1,296*	*5,737*	*35,663*	*225*
Penwell	*857*	*23,193*	*24,307*	*173*
Waddell-Edwards	*524*	*4,267*	*62,543*	*90*
Sand Hills	1,171	3,777	79,823	184
Seminole	1,449	5,367	104,633	290
Sharon Ridge	420	1,302	7,498	172
Slaughter-Dean	7,531	14,271	467,049	1,203
Taylor-Link	609	7,696	8,164	121
Ward, North	2,508	26,059	64,801	494
Magnolia-Sealy & S.	*392*	*538*	*15,452*	*61*
North Ward-Monahans	*2,072*	*25,431*	*47,339*	*424*
Spencer	*44*	*90*	*2,010*	*9*
Ward, South	2,899	44,162	101,008	1,042
Estes	*1,465*	*13,226*	*24,754*	*341*
South Ward-Shipley	*1,434*	*30,936*	*76,254*	*701*
Wasson	9,401	42,549	411,101	1,387
Weiner	81	84	2,916	19
Westbrook	222	9,642	2,758	87
Wheat	337	8,925	9,075	85
World	610	8,178	7,822	77
Yates district	7,481	277,372	395,528	919
Crockett	*87*	*354*	*1,846*	*37*
Noelke	*85*	*192*	*6,128*	*31*
Tobarg	*447*	*7,419*	*5,031*	*253*
White and Baker	*83*	*253*	*977*	*19*
Yates	*6,749*	*269,154*	*381,546*	*579*
Miscellaneous	460	3,270	26,400	91
Total West Texas	80,680	1,277,338	2,990,223	15,074

PRODUCTION AND RESERVES—TEXAS PANHANDLE

Carson County	4,398	43,466	92,924	709
Gray County	13,654	199,612	276,778	2,367
Hutchinson County	11,399	167,200	237,650	2,023
Moore County	162	5,338	2,542	14
Wheeler County	1,500	23,609	23,551	386
Total	31,113	439,225	633,355	5,449

OFFICIAL
PHOTOGRAPH
U. S. ARMY AIR CORPS

Today... WAR SAVINGS BONDS

. . . ARE SENDING THIS MODERN FIGHTER ON IT'S ROAD TO VICTORY

Back in 1918 Liberty Bonds paid for the planes with which to fight German "Kultur." Those planes weren't much, but our boys flew them like the heroes they were . . . and won.

Today . . . your War Savings Bonds are paying for our modern fighter planes . . . planes our old pilots probably dreamed about . . . fighter planes that are making our pilots feared and respected by all the Axis forces.

We need thousands of these "ships of the air" for we have not only the Germans to fight, but the Japs as well.

Put *all* your savings to work for the best trained fighters on earth . . . buying planes and armament with which to end forever the Nazi and Nipponese menace to civilization and freedom.

LET'S LEND EVERY AVAILABLE DOLLAR TO UNCLE SAM—THE BEST SECURITY ON EARTH

REED ROLLER BIT CO.
HOUSTON, TEXAS,

opment in the area. It opens up a large area for further prospecting.

Embar-Permian Pool

The Embar-Permian pool so far has only two wells and the largest of these, the first, had a potential of 264 bbl. through 2-in. tubing from pay topped at 6,210 ft. The second well made 259 bbl. per day. Development of the Ellenburger in the same pool has overshadowed the Permian pay and the two completions so far were plug-backs after the deeper pay failed to produce.

The Clear Fork Monahans discovery was really due to the drilling of the deeper Ellenburger as porosity in the Permian section was found while drilling the test to the Ordovician. A second well was drilled to test the Clear Fork and was completed October 14 for an initial of 759 bbl. through perforations 5,633-43 ft. A second Clear Fork test is being drilled about ½ mile west of the Permian pay discovery.

SOUTHERN WEST TEXAS DISTRICT

Summary of Wells Completed During 1942

Field, county—	Comp.	Oil	Prod.	Gas	Dry
Wildcats	59	1	226	0	58
Abell, Pecos	49	40	39,338	2	7
Abell (Permian)	13	8	2,112	0	5
Apco-Warner, Pecos	12	10	7,675	0	2
Barnhart, Reagan	9	9	5,160	0	0
Bean (abd.)	1	0	0	0	1
Beddo	1	1	60	0	0
Big Lake (Permian), Reagan	3	1	3,423	0	2
Byrd, Ward	5	4	305	0	1
Chancellor, Pecos	3	2	750	0	1
Clara Couch, Crockett	13	6	1,186	1	6
Crockett, Crockett	3	3	217	0	0
Dune, Crane	4	3	495	0	1
Embar, Ector	1	1	84	0	0
Emperor, Winkler	10	10	5,773	0	0
Emperor (Deep)	4	3	980	0	1
Estes, Ward	9	9	6,111	0	0
Foster, Ector	16	13	22,799	0	3
Fromme, Pecos	3	1	90	0	2
Goldsmith, Ector	18	18	17,828	0	0
Grayson, Reagan	1	1	32	0	0
Harper, Ector	2	1	418	0	1
Henderson, Winkler	2	2	1,004	0	0
Hoover, Crockett	2	0	0	0	2
Pruitt, Ward	1	1	15	0	0
Johnson, Ector	10	8	4,782	0	2
Jordan, Crane and Ector	6	6	2,373	0	0
Keystone-Colby, Winkler	45	45	10,466	0	0
Keystone (lime)	3	3	1,199	0	0
Lehn, Pecos	1	1	160	0	0
Magnolia-Sealy, Ward	2	0	0	0	2
McKee, Crane	1	1	226	0	0
Jamison & Pollard, Pecos	1	1	16	0	0
South Sealy, Ward	2	2	925	0	0
McCamey, Upton	10	10	1,779	0	0
McElroy, Crane and Upton	15	15	10,035	0	0
Monahans (Ordovician), Pecos	1	1	2,835	0	0
Monahans (Tubb), Pecos	1	1	759	0	0
South Shipley, Ward	1	1	49	0	0
Noelke, Crockett	8	4	3,419	3	1
North Cowden, Ector	30	26	21,303	0	4
North Ward, Ward and Winkler	8	8	529	0	0
Midway, Ector	1	1	20	0	0
O'Neal, Pecos	1	1	29	0	0
Page, Schleicher	1	0	0	1	0
Pecos Valley, Pecos and Ward	3	3	233	0	0
Pyote, Ward	4	2	971	0	2
South Sand Hills (Ordovician), Crane	10	10	66,373	0	0
Sand Hills (Permian), Crane	21	20	11,018	1	0
Scarborough, Winkler	2	2	226	0	0
Sun-Shannon, Crockett	2	2	463	0	0
Shearer, Pecos	1	1	146	0	0
Shipley, Ward	6	6	1,378	0	0
South Cowden, Ector	6	5	296	0	1
South Ward, Ward	1	1	50	0	0
Spencer, Ward	6	4	508	1	1
Taylor-Link, Pecos	16	13	1,362	0	3
Tobarg, Pecos	3	3	60	0	0
Todd, Crockett	3	1	386	0	2
Waddell, Crane	10	10	70,365	0	0
Walker, Pecos	24	18	1,829	0	6
Weiner, Winkler	11	10	2,295	1	0
Wentz, Pecos	2	2	297	0	0
White & Baker, Pecos	4	2	168	0	2
White & Baker extension	2	2	159	0	0
World, Crockett	16	13	1,523	0	3
Total	545	413	337,391	10	122

NORTHERN WEST TEXAS DISTRICT

Summary of Wells Completed During 1942

Field, county—	Comp.	Oil	Prod.	Gas	Dry
Wildcats	48	2	394	0	46
Bieg-Wright, Cochran	2	1	450	0	1
Cedar Lake, Gaines	19	18	8,985	0	1
Dean, Cochran	2	2	376	0	0
Embar-Ellenburger, Andrews	8	5	4,319	0	3
Embar-Tubb, Andrews	2	2	523	0	0
Emma, Andrews	14	14	12,873	0	0
Fullerton, Andrews	8	8	6,479	0	0
Iatan-East Howard, Howard and Mitchell	20	20	4,660	0	0
Mascho, Andrews	4	4	559	0	0
Ownby, Yoakum	1	1	470	0	0
Post, Garza	1	1	101	0	0
Seminole, Gaines	6	6	2,924	0	0
Sharon Ridge, Mitchell and Scurry	18	17	2,416	0	1
Slaughter, Cochran, Hockley and Terry	424	421	442,562	0	3
Stinnett, Lubbock	1	1	66	0	0
Sunray-Wright, Cochran	1	1	238	0	0
Waples-Platter, Yoakum	2	2	312	0	0
Wasson, Gaines and Yoakum	94	93	51,578	0	1
Welch, Dawson	1	1	181	0	0
West Andrews, Andrews	17	15	2,061	0	2
West Fuhrman, Andrews	14	14	1,882	0	0
South Andrews, Andrews	1	1	95	0	0
Fuhrman, Andrews	1	1	218	0	0
Robertson, Gaines	1	1	299	0	0
Total	710	652	545,021	0	58

WEST TEXAS

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	189	169	2	18	812,131
February	148	134	0	14	642,294
March	148	130	1	17	681,999
April	122	100	4	18	538,725
May	119	98	1	20	579,412
June	78	62	1	15	336,969
July	77	65	0	12	308,569
August	96	82	0	14	421,919
September	62	51	1	10	155,880
October	83	68	0	15	348,706
November	55	45	0	10	246,640
December	78	61	0	17	360,863
Total 1942	1,255	1,065	10	180	5,434,107
Total 1941	2,297	2,121	13	163	9,944,416
Difference	1,042	1,056	3	17	4,510,309

The Embar-Ellenburger pool was discovered in May and at the end of the year had five oil wells and three dry holes. The daily initial of the successful wells was 4,319 bbl. and the three dry holes do not outline the field so future development may be expected.

From the standpoint of reserves the Monahans pool (Ellenburger) may be the most important discovered in West Texas during the year. So far it has only one well and is a rank wildcat getting its first production May 4 from pay topped at 10,082 ft. with 280 ft. of pay being reported. The well's initial was 2,852 bbl. The thickness of the pay section and the size of the structure as outlined by geophysical exploration indicate a major pool. Development will probably be slow as the leases are owned by one company and the royalty is not divided.

Adding strength to the Ordovician prospects was the continued development of the Barnhart pool in Reagan County which completed nine more producers in the Ellenburger. These wells average 9,300 ft. and the drilling is not particularly easy but the initial potentials average better than 500 bbl. per well.

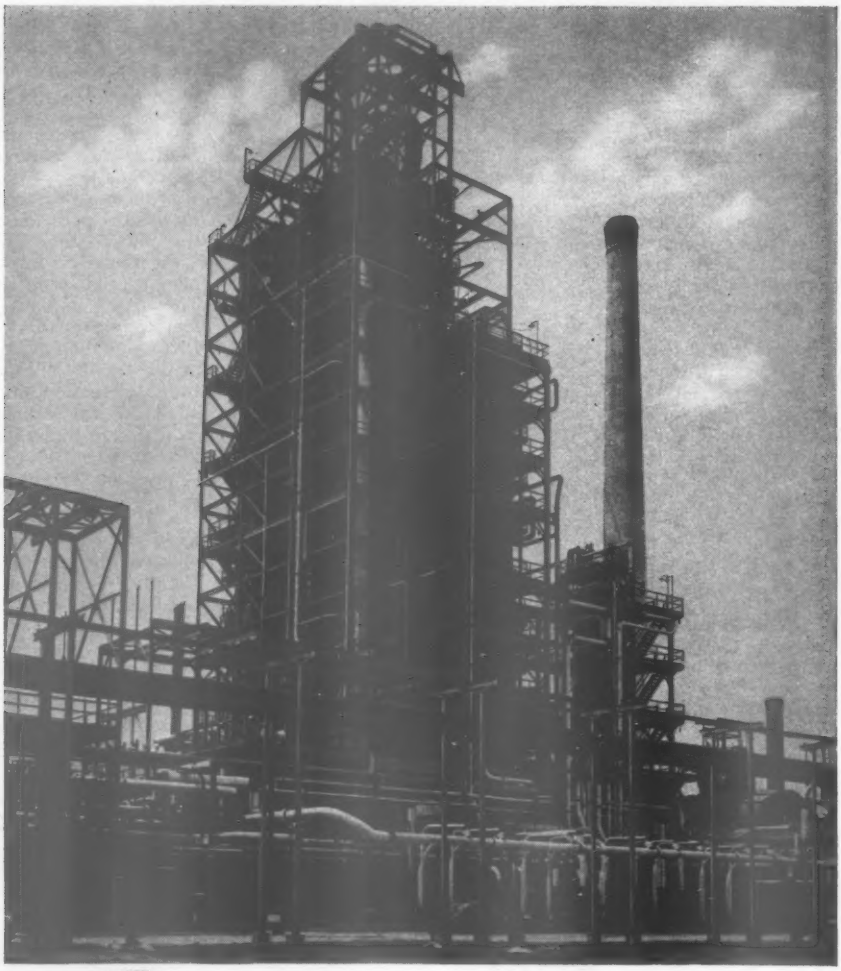
Andrews County Active

Andrews County led the area with eight discoveries and extensions which provide enough fertile territory to keep operators busy during the coming year. Pecos County also had a successful year with six discoveries and extensions with which to keep occupied during 1943. Winkler County did not enjoy any new discoveries but kept busy drilling in the Weiner and Keystone-Colby sand pools and still had plenty of work to do when the year ended. Ector County was extremely quiet with only small extensions to already defined pools and only one new pool discovered. Gaines and Yoakum counties were very quiet although the former had one new pool, Robertson, which did not appear to be of great importance.

Ward County had six new pools including the two Monahans pools mentioned above. However, none of the four remaining pools appear to be large although future development may improve the picture. Crockett County had one new pool which showed only two completions at the year's end but important extensions in the Noelke and World pools added encouragement.

The Slaughter pool continued to expand and at the end of the year showed 72,000 acres developed with expansion being toward the north. So far it is not defined on the north side and further extensions are in order. Already, Slaughter is the second largest oil field in the world as far as area is concerned. The oil is obtained from the San Andres lime which averages about 100 ft. of pay. A well drilling in the north end of the pool

(Continued on Page 126)



Rubber FROM PETROLEUM . . .

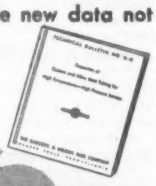
NO NEW JOB FOR B&W

From the very inception of the petroleum industry's interest in substitutes for natural rubber, Babcock & Wilcox Tube Co. engineers have worked closely with refiners, to develop tube specifications for this vitally important activity. B&W engineers have thereby contributed materially toward getting into operation plants now producing butadiene, styrene and other synthetic rubber ingredients, as well as petroleum-derived components of explosives and aviation fuel.

Implementing the advisory service of B&W engineers are B&W facilities for producing tubing for high-pressure, high-temperature service. These include the country's largest specialty tube mill equipped to produce "tailor made" tubing and pipe under strict metallurgical control.

B&W advice is at your service to help you speed large-scale commercial production of rubber substitutes.

157-page Technical Bulletin 6-D, "Properties of Carbon and Alloy Steel Tubing" contains valuable new data not published elsewhere. A request on your business stationery will bring you a copy promptly.



BABCOCK & WILCOX TUBES

HOT FINISHED • COLD DRAWN • CARBON STEELS • ALLOY STEELS

THE BABCOCK & WILCOX TUBE CO., BEAVER FALLS, PA.

TA-1239

Square Lake Develops Into Major Pool

THE Square Lake pool of Eddy County was the leading Southeast New Mexico development spot during the year of 1942. There were a total of 96 wells drilled in the pool, 92 of which were successful, 1 was a small gasser, and only 3 were failures. The activity all started with completion of Choate & Brown 1 Hover-State, 2-17s-30e, which flowed 200 bbl. per day from lime pay from 2,903-78 ft. after shot of 150 qt. of nitroglycerin. In June, Choate & Brown sold this property along with other leases totaling 440 acres in the area to Barney Cockburn for $140,000 cash and $160,000 in oil. Cockburn immediately started a drilling campaign.

Continued drilling in the Maljamar pool of Lea County accounted for the completion of 35 new producing wells in the Whitehorse and the Queen lime. The field is approaching its limits although there is still room for some expansion. There are a number of dry holes around the field and future drilling will probably be light.

In the Jackson-Grayburg area a revival of interest due to the favorable results in Square Lake caused the drilling of 32 new oil wells and 5 dry holes. There is considerable room for more development much of which will probably take place during the coming year if material can be obtained. The average initial of the wells is in the neighborhood of 150 bbl. The pay zone is the Whitehorse lime and it is found around 3,300 ft.

The development in the Shallow Red Lake district, where production is found at about 500 ft. continued with moderate success. There were 34 completions in the area, 12 of which were oil wells with approximately 50 bbl. initial production average.

Discoveries in the area were not outstanding, the best one being the East Lusk, in Lea County, northwest of the old Lynch area. At the end of the year, this pool had seven oil wells at an average depth of 2,700 ft. and an average potential of 200 bbl. Production is obtained from the Whitehorse lime. Other discoveries were light and no completions other than the original wells were recorded.

SOUTHEAST NEW MEXICO
Summary of Wells Completed During 1942

	Comp.	Oil	Prod. Gas	Dry
Arrowhead, Lea	10	9	3,536	0	1
Artesia, Eddy	2	1	7	0	1
Cooper, Lea	3	2	615	1	0
Culwin, Eddy	1	1	30	0	0
East Lusk, Lea	8	7	1,575	0	1
Eaves, Lea	1	0	0	0	1
Getty, Eddy	1	1	192	0	0
Lynn, Lea	3	1	120	1	1
Halfway, Lea	1	1	233	0	0
Hobbs, Lea	1	1	130	0	0
Jackson-Grayburg, Eddy	37	32	5,242	0	5
Loco Hills, Eddy	11	9	3,351	0	2
S. Lovington, Lea	1	1	78	0	0
Maljamar, Lea	40	35	7,668	1	4
Mattix, Lea	2	2	181	0	0
Monument, Lea	8	5	1,600	0	3
N. Lynch, Lea	1	0	0	0	1
Penrose, Lea	2	1	20	0	1
Philmex, Lea	1	1	603	0	0
Red Lake, Eddy	34	12	602	0	22
Rhodes, Lea	4	2	159	2	0
Shugart, Eddy	2	1	70	0	1
Skelly, Lea	3	2	103	1	0
Square Lake, Eddy	96	92	16,436	1	3
W. Eunice, Lea	7	4	1,105	0	3
S. Eunice, Lea	2	2	291	0	0
Vacuum, Lea	4	4	298	0	0
Wills, Eddy	1	1	26	0	0
Wildcats:					
Chaves	5	1	2	0	4
Eddy	3	0	0	0	3
DeBaca	1	0	0	0	1
Lea	12	1	0	1	10
Roosevelt	1	0	0	0	1
Miscellaneous:					
Eddy County	14	6	857	0	8
Lea	2	2	239	0	0
Total	325	240	45,369	8	77

The Arrowhead pool in Lea County was extended to the north with a total of nine new oil wells added and one dry hole. However, the one failure seemed to limit the pool on the northwest leaving a limited outlet for further expansion.

At the year's end a test was drilling east of Langlie in Lea County at about 8,000 ft. in lime and chert. The well is the R. Olsen and Atlantic 1 Langlie, SE SE 11-25s-37e, which logged some shows at around 5,000 ft. in the Permian section.

Another important wildcat completed at the end of the year was the Ohio Oil Co. 1 State-McCormick, 36-9s-37e, Lea County, which drilled 25 ft. of porous lime and swabbed about 30 bbl. a day after 3,000 gal. acid treatment. It was re-treated with acid but did not improve and the well was abandoned. It did encourage those interested in the area and further testing will probably be in order.

Generally, the southeastern New Mexico area was in a slightly more favorable position than the Texas Permian basin due to a higher allowable. Forty-acre spacing has been no hindrance and the completions by months table shows that the activity in the area was extremely steady and showed little decline.

Texas Panhandle

Spurred by an increased demand for crude and with prospects of still further increase, the Panhandle was more than usually active in 1942. Completions in 1942 were more than double those of 1941 and, as there is much virtually proven acreage to be drilled, the proportion of dry holes was very low. Wildcatting outside of the main field was sporadic and without success. The gas area was enlarged by completions in Sherman and Hansford counties.

TEXAS PANHANDLE
Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	73	61	12	0	220,679
February	39	31	8	0	118,965
March	27	23	2	2	82,498
April	14	14	0	0	47,189
May	31	29	0	2	93,524
June	16	12	4	0	47,801
July	23	18	4	1	70,773
August	24	14	9	1	73,232
September	21	14	5	2	69,890
October	21	18	2	1	62,870
November	15	9	5	1	46,188
December	24	15	7	2	79,523
Total 1941	328	258	58	12	1,013,132
Total 1942	718	648	49	21	2,217,746
Difference	390	390	9	9	1,204,614

PRODUCTION AND RESERVES—NEW MEXICO

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Artesia-Red Lake	305	5,446	4,954	253
Artesia	*199*	*4,836*	*3,164*	*178*
Red Lake	*106*	*610*	*1,790*	*75*
Cooper-Lynn	1,529	24,772	22,777	174
Cooper	*792*	*13,886*	*11,114*	*87*
Eaves	*234*	*2,446*	*3,154*	*23*
Jal	*112*	*6,005*	*2,745*	*18*
Lynn	*265*	*1,912*	*4,083*	*29*
Rhodes	*126*	*524*	*1,676*	*17*
Eunice-Monument	13,820	121,274	259,726	1,182
Arrowhead	*1,195*	*4,215*	*20,785*	*111*
Eunice	*5,242*	*58,703*	*111,297*	*491*
Monument	*6,698*	*53,009*	*111,991*	*503*
South Eunice	*685*	*5,347*	*15,653*	*77*
Getty-Barber	310	844	3,556	22
Grayburg-Loco Hills	3,363	19,573	56,867	435
Grayburg-Jackson	*1,566*	*11,670*	*28,330*	*208*
Leonard	*214*	*1,380*	*7,120*	*46*
Loco Hills	*1,583*	*6,523*	*21,417*	*181*
Halfway	80	260	940	10
Hobbs	2,928	100,801	59,199	253
Hospah	100	485	2,515	25
Langlie-Mattix	1,941	14,797	19,373	284
Langlie	*986*	*7,742*	*10,008*	*126*
Mattix	*955*	*7,055*	*9,345*	*158*
Lynch and North	107	7,115	2,485	13
Maljamar and South	1,740	5,808	29,192	183
Penrose-Hardy	1,785	15,839	30,371	399
Hardy-Skaggs	*554*	*4,971*	*10,229*	*123*
Penrose	*836*	*7,766*	*13,734*	*192*
Skelly	*395*	*3,092*	*6,408*	*84*
Shugart-Leo	208	741	3,269	36
South Lovington	462	1,643	6,357	41
Square Lake	290	290	19,710	92
Vacuum	3,443	16,720	118,380	345
West Eunice	167	484	2,316	19
Miscellaneous	234	732	5,168	47
Total SE New Mexico	32,812	337,615	647,155	3,813
Total NW New Mexico	180	7,528	2,282	76
Total New Mexico	32,999	344,873	649,637	3,889

CALIFORNIA

Four Small Fields Found in California in 1942

by L. P. Stockman

AS has been the case for the past several years, California's crude-oil reserves were substantially reduced during 1942, reflecting the inability of prospectors to discover new oil fields of primary importance. Four new fields, Antelope Plains and East Strand in Kern County, Buena Park in Orange County and Holser anticline in Ventura County, as well as two gas fields, were discovered in California during 1942. This is a normal rate of discoveries but the quality of the fields from a production standpoint left much to be desired. It is necessary to discover approximately 225,000,000 bbl. of new production annually in order to even maintain crude-oil reserves. It has been several years since a new major discovery has been made in California and while under normal conditions it would be possible to develop known reserves, the present situation makes the outlook far from sanguine. The number of wildcats being drilled is far from sufficient and it will be necessary for prospectors to enlarge the amount and scope of wildcat exploration. The reduction in crude-oil reserves that took place in California during 1942 would not look as bad as it does if PAW had permitted development of partially developed zones in California fields. Specifically, if drilling had been permitted in the Tar zone at Wilmington it would be able to allow some appreciation for the value of this zone. As the situation now stands the zone is almost wholly undeveloped in the Terminal section of the field and thus very little allowance can be given in reserves until additional wells are drilled and the extent of the zone revealed. A somewhat similar situation exists at Inglewood where drilling has been suspended in the Sentous zone of Miocene age. Only a limited amount of drilling has been done in the Sentous and consequently its true value cannot be estimated on the basis of present development. The Tar zone at Wilmington in the Terminal section of the field probably contains a reserve of 50,000,000 bbl., but this will not be actually proved up until additional drilling is permitted. The reason this zone has not been developed can be attributed to the fact that Wilmington is a multiple-zone field and PAW refuses to authorize additional drilling except on the basis of surface acreage.

Production in California during 1942 was at the highest rate in a number of years and there is every indication that crude-oil production in 1943 will be at a still higher level provided hostilities continue and the state is able to reach higher production levels. A few years ago, California's normal markets would not have been able to absorb an annual production in excess of 248,000,000 bbl. of crude oil without substantially increasing stocks of crude and refined oil. In contrast with this, marketers actually reduced stocks over 12,000,000 bbl. during 1942. The largest part of this reduction took place in fuel-oil stocks which were re-

PRODUCTION AND RESERVES—CALIFORNIA FIELDS

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
SAN JOAQUIN VALLEY				
San Joaquin Valley:				
Antelope Plains	93	93	7,407	10
Arvin	202	1,508	1,992	12
Belridge, North	1,939	46,601	28,399	73
Belridge, South	978	34,601	9,139	303
Canal	1,078	7,661	20,839	37
Coalinga district	19,285	405,338	479,707	1,343
Coalinga, East	*5,248*	*226,654*	*53,436*	*460*
Coalinga, Nose	*11,917*	*25,183*	*404,862*	*213*
Coalinga, West	*2,120*	*153,501*	*21,499*	*670*
Coles Levee	5,437	14,271	55,729	123
Edison	1,019	9,339	10,661	112
Elk Hills	4,362	162,099	172,901	211
Fruitvale	2,300	26,651	17,350	171
Greeley	2,580	9,026	35,974	78
Helm	77	79	823	7
Kern River	5,737	330,985	54,015	2,323
Kettleman	13,015	265,214	304,786	257
Lost Hills	1,397	52,708	13,292	369
McKittrick	1,786	94,157	20,843	271
Midway-Sunset	20,440	932,872	227,128	3,203
Mountain View	1,595	41,976	13,024	165
Mount Poso	7,517	54,785	65,215	413
Paloma	272	475	4,525	2
Raisin City	304	366	4,634	6
Rio Bravo	3,573	16,295	53,705	96
Riverdale	95	95	1,905	11
Round Mountain	3,927	34,665	35,335	250
Strand, West	416	1,631	4,869	13
Ten Section	4,813	20,398	69,602	120
Wasco	455	2,180	5,820	13
Wheeler Ridge	99	4,020	980	34
Miscellaneous	196	258	7,152	14
Total	104,087	2,560,347	1,723,691	10,042
COASTAL DISTRICT				
Aliso Canyon	713	2,422	12,378	18
Capitan	843	6,490	10,310	53
Del Valle	276	1,003	8,997	11
Elwood	877	69,293	11,707	54
Gato Ridge	1,224	6,803	13,197	20
Newhall-Potrero	1,301	3,576	21,424	33
Oak Canyon	148	196	2,304	6
Padre Canyon	355	2,062	2,938	18
Rincon	1,011	15,094	10,106	69
San Martinez	241	891	2,109	10
San Miguelito	1,236	7,104	12,646	27
Santa Barbara	61	3,415	665	16
Santa Maria	2,742	144,980	30,520	258
Santa Maria Valley	7,552	29,701	70,299	229
Ventura Avenue	13,649	252,309	147,691	402
Ventura Newhall	1,742	65,676	18,324	526
Miscellaneous	75	6,961	799	12
Total	34,046	617,976	376,614	1,762
LOS ANGELES BASIN				
Brea Olinda	3,714	171,608	33,392	397
Coyote, East	2,066	45,662	24,338	127
Coyote, West	3,785	129,232	40,768	110
Dominguez	7,924	138,178	73,822	295
El Segundo	431	10,567	4,833	35
Huntington Beach	12,108	313,119	121,881	645
Inglewood	6,749	132,443	77,557	281
Long Beach	13,124	660,302	119,698	1,139
Los Angeles-Salt Lake	199	66,231	1,769	98
Montebello	3,956	131,204	42,796	353
Playa del Rey	1,233	48,721	13,279	121
Potrero	316	4,593	3,207	25
Richfield	2,893	95,014	24,986	207
Rosecrans	2,727	50,909	26,091	182
Santa Springs	7,763	484,938	85,062	573
Seal Beach	3,031	92,866	35,134	133
Torrance	3,056	107,280	32,720	626
Turnbull Canyon	112	112	988	4
Whittier	373	18,791	3,809	158
Wilmington	33,696	173,717	326,283	1,102
Miscellaneous	106	208	1,592	10
Total	109,362	2,875,695	1,094,009	6,720
Total California	248,395	6,054,018	3,194,314	18,524

duced approximately 9,000,000 bbl. The production allocation for January 1943 is about 100,000 bbl. per day above the allowable set for January of last year, thus indicating a need of larger production during the current year. This demand reflects increased requirements for the armed services as well as a substantial gain in the consumptive demand in Pacific Coast territory. A large part of this gain in the Pacific Coast states can be attributed mainly to expansion in plants producing war equipment in whole or in part.

More Drilling Necessary

In order to be able to meet increased production requirements during 1943, it will probably be necessary to substantially increase drilling operations in California fields during the next several months. Last year operators completed 556 oil wells, 25 gas wells and abandoned 247 others that failed to show commercial production of oil or gas. This represents a total of 828 holes drilled and if the same percentage of failures prevails during 1943 it will be necessary to drill not less than 1,000 holes. Total footage drilled last year declined from 533,816 ft. during January 1942 to 281,028 ft. during December. Total footage drilled during the year totaled 3,358,705 ft. This footage represents the total registered from the 828 holes mentioned above. It is estimated that approximately 5,000,000 ft. of new hole will be drilled during 1943 provided, of course, there is ample pipe and equipment made available for such work. The expectation that California operators will be able to drill approximately 1,000 new holes and about 5,000,000 ft. of new hole is based on an estimate made by D. R. Knowlton who told California operators December 16, 1942, that while less drilling would be done in the United States during 1943, California should be allowed to increase the scope and amount of drilling during the present year.

The necessity of maintaining crude-oil reserves in California is so important that Ralph Davies told operators a short time ago that "your problem of finding additional reserves through the discovery of new fields has become increasingly difficult. Results of exploration within recent years have been discouraging. No great additions to California productive capacity have been made since the discovery of the Gatchell sand at Coalinga and of Coles Levee in 1938, the discovery of the Terminal zone at Wilmington in 1936, and the group of prolific fields in the Valley discovered from 1936 to 1939 with the aid of the reflection seismograph. Very few prospects are reported to have been found within the last year or two and we seem to be faced with the necessity of taking longer chances in our exploratory work than has been necessary in the past. Our problem is to find additional oil as soon as possible. If it cannot be done with 124 wildcats per year then we must double the number of prospect holes drilled. I am advised that the greatest opportunity to find additional reserves in California is likely to be through the discovery of stratigraphic-trap types of fields and that the exploration for such fields is likely to cost much more in dry holes than the structural-trap type of prospecting which has occupied most of our attention in the recent past." This statement of conditions is just as true today as it was last year.

Cretaceous Possibilities

A recent check made of wildcat exploration failed to reveal any single wildcat that showed great encouragement. This may be due to the fact that many tests are being drilled outside of the area generally considered as offering the most opportunity. It is quite likely that exploration work during 1943 will be scattered over a wide section of the state but it would seem fairly possible that the greatest number of new discoveries will come from the three central basins and along the coastal district. Potential possibilities of other sections of the state must remain conjectural until some major discoveries have been recorded. There is no reason why major oil fields should not be discovered north of Coalinga but until some primary discoveries are made this area must remain as promising but not yet productive. The geological fraternity appears to have cooled off very much with respect to Cretaceous possibilities for the production of crude oil. A year or so ago formations of this age were considered as possibilities, but today exploratory work in the Cretaceous has as its objective the discovery of new gas fields. Union Oil Co. at the close of 1942 was still working on a Cretaceous test on the Ciervo anticline in San Benito County, but to date only gas has been found. This wildcat has been held up for some time with mechanical trouble and has been drilling for several months. Tests for commercial gas production were not conclusive and it remains to be seen whether the company will be able to drill ahead to make a conclusive test. It is generally conceded that the Cretaceous possibilities as a source of oil have been greatly ignored and when these rocks are subjected to a more detailed study and receive the number of tests they justify they may have an important effect on future production.

If prospectors are unable to discover new prolific oil fields during 1943, operators may have to rely upon existing fields to increase production to the levels set by the Conservation Committee. There are a number of fields in the state that present deep-zone possibilities as well as several fields where deep zones have al-

CALIFORNIA

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Aliso Canyon	5	2	397	2	1
Antelope Plains	11	10	3,068	1	0
Arvin	1	1	80	0	0
Belridge, North	4	4	1,544	0	0
Belridge, South	86	86	4,597	0	0
Bowerbank gas field	2	0	0	1	1
Brea Olinda	4	4	805	0	0
Buena Park	4	2	522	0	2
Canal	1	1	498	0	0
Coalinga, East	20	19	2,914	0	1
Coalinga, Nose	14	14	24,400	0	0
Coalinga, West	15	10	404	0	5
Coles Levee	15	14	19,042	0	1
Coyote, East	5	4	521	0	1
Coyote, West	2	2	1,687	0	0
Delano gas field	3	0	0	2	1
Del Valle	2	2	689	0	0
Dominguez	5	4	1,208	0	1
Dyer Creek	1	0	0	0	1
Edison	6	3	282	0	3
Elk Hills	6	4	2,397	2	0
Fruitvale	4	3	255	0	1
Gato Ridge	3	3	1,105	0	0
Greeley	10	10	17,011	0	0
Helm	7	7	2,052	0	0
Huntington Beach	21	21	5,665	0	0
Inglewood	5	4	3,981	0	1
Jacalitos	7	5	720	0	2
Kern River	33	25	1,964	0	8
Kettleman North Dome	14	14	6,802	0	0
Long Beach	3	1	120	0	2
Lost Hills	3	3	246	0	0
Marysville Buttes gas field	1	0	0	1	0
McKittrick	7	2	72	0	5
Midway-Sunset	78	62	4,594	0	16
Montebello	4	4	410	0	0
Mountain View	1	0	0	0	1
Mount Poso	32	26	2,640	0	6
Newhall Potrero	7	7	5,699	0	0
Oak Canyon	3	2	1,046	0	1
Paloma	3	3	708	0	0
Potrero	1	1	325	0	0
Raisin City	8	4	1,323	2	2
Richfield	1	0	0	0	1
Rincon	1	0	0	0	1
Rio Bravo	3	2	2,820	0	1
Rio Vista gas field	13	0	0	11	2
Riverdale	11	10	3,208	0	1
Roberts Island gas field	1	0	0	1	0
Rosecrans	6	4	898	0	2
Round Mountain	19	11	1,555	0	8
San Martinez	7	6	4,976	0	1
San Miguelito	3	3	2,358	0	0
Santa Fe Springs	1	1	48	0	0
Santa Maria	9	6	4,979	0	3
Santa Maria Valley	33	29	16,983	0	4
Seal Beach	1	1	209	0	0
Shafter	1	1	104	0	0
Strand, East	1	1	1,992	0	0
Strand, West	1	1	656	0	0
Summerland	1	0	0	0	1
Ten Section	5	5	4,019	0	0
Tompkins Hill gas field	1	0	0	1	0
Torrance	11	11	1,194	0	0
Turnbull Canyon	3	3	1,652	0	0
Union Avenue	2	2	95	0	0
Ventura Avenue	17	16	18,412	0	1
Ventura-Newhall	24	7	850	0	17
Wheatville	1	1	122	0	0
Whittier	3	0	0	1	2
Wilmington	38	38	9,305	0	0
Yorba Linda	4	4	820	0	0
Wildcats	139	0	0	0	139
Total	828	556	199,048	25	247

Summary of Completions by Months, 1942

	Comp.	Oil	Gas	Dry	Footage
January	106	70	8	28	538,816
February	80	47	2	31	395,084
March	26	15	0	11	133,525
April	49	25	2	22	314,062
May	55	28	1	26	209,742
June	64	37	5	22	254,154
July	64	36	3	25	249,965
August	42	27	2	13	201,490
September	71	49	0	22	264,502
October	86	73	1	12	286,538
November	90	84	1	5	234,799
December	95	65	0	30	281,028
Total 1942	828	556	25	247	3,358,705

"Isabel" CHANGES HER MAKE-UP
Tanks, trucks, jeeps, guns, planes, boats all get new "facials" often—protective colorings that blend with backgrounds, changing with the seasons or locale. Paint sprayers, powered by dependable Briggs & Stratton gasoline motors, do these jobs quickly.
Unusual tasks, like this one, form only a small part of our service to the armed forces — and are in addition to dozens of major uses—but all of them equally important.
The war effort now requires the entire production of Briggs & Stratton 4-cycle, air-cooled gasoline motors, so they are available only to those who are serving the war program, or for approved "essential" civilian uses.
We'll do our best to serve you, if your product fits these classifications, or if you are planning post-war production of gasoline-powered appliances and equipment.
To conserve Briggs & Stratton Motors now in use, we urge operators to take extra precaution to see that each motor is correctly lubricated, properly adjusted and kept clean.
In case of emergency see your regular dealer or the nearest Authorized Briggs & Stratton Service Station.
BRIGGS & STRATTON CORP.
MILWAUKEE, WISCONSIN, U. S. A.
To help make this a better world to live in
BUY WAR BONDS
ARMY NAVY
4 CYCLE
GASOLINE MOTORS

ready been proved up. It will require additional drilling to step up the production of fields already known to contain deeper productive zones and for this reason much depends upon whether this additional development work will be permitted by the Petroleum Administration for War. The completion of a new well in a new and prolific field will not result in increased production unless additional drilling is permitted and the same situation prevails in existing fields having deep undeveloped zones. California is not producing to its maximum capacity at the present time due to bottlenecks in the coastal district. If adequate pipe-line outlets were available, the production of Santa Maria Valley and other fields in that region could be greatly increased. Marine transportation is too hazardous, however, to permit any appreciable increase in production and so the Conservation Committee must look elsewhere for any increase desired.

Conversion of the Stanpac gas line to crude-oil service has greatly alleviated conditions in the San Francisco Bay region by increasing the amount of crude oil that can be moved into that area. For several years refiners in the San Francisco Bay area had depended upon marine transportation for the movement of crude oil from the San Joaquin Valley and the coastal district to refining centers. War conditions rendered the use of tankers quite hazardous and consequently steps were taken last year to increase pipe-line facilities to take the place of marine transportation.

Playa Del Rey Storage

During 1942 the Defense Plant Corp. took possession of a portion of the Playa Del Rey field in Los Angeles Basin and appointed Southern California Gas Co. as one of its agents and Union Oil Co. as the operating agent. This project is a gas storage plan whereby surplus gas will be stored during the summer months and withdrawn during the winter period when gas demand is higher than pipe-line capacity.

During the last few months of 1942 Southern California Gas Co. made a series of tests to determine whether the Del Rey structure would retain the gas injected and whether it would move upstructure and thus require less pressure than would be required if the gas remained trapped within a limited area. The area took gas direct from line pressure at a satisfactory rate and plans are under way to install the necessary compressors for use next summer. When this program started there was some question as to whether the gas injection would result in increased production of crude oil but after the plan had been in effect for a short period it was generally agreed the gas storage plan would prove feasible and result in increased production of crude oil.

Pauls Valley and East Watchorn Pools Are Leading Discoveries in 1942

by Carl Hoot

AT the close of 1942, Oklahoma's decline in production had not been checked by any major strike. However, reserves have been bolstered to a certain extent by edge wells on old fields and reworking programs in a number of pools. An example of the latter is the Oklahoma City field, where wells have been redrilled after producing a number of years and have yielded a high percentage of their initial production. Early in the year the Texas Co. started cleaning out and drilling deeper at its Apache pool in Caddo County, with the result that many wells exceeded their initial flow. Edge wells that have extended the St. Louis area north have produced, both on the pump and flowing, from 50 to 640 bbl. a day in Hunton lime at around 4,850 ft.

The total of 1,159 completions in 1942 was off 45 per cent in comparison with 2,110 wells finished last year. The percentage of oil wells to the number completed fell from 58 per cent in 1941 to 46 per cent in 1942.

Pauls Valley

According to the Nomenclature Committee, there were approximately 50 new oil and gas fields extensions and deeper zones opened during the year. While the Pauls Valley pool of Garvin County is generally regarded as the best find of the year, the East Watchorn pool in Pawnee County was running a close second. Eleven wells, and three others nearing completion, with an initial production of 6,061 bbl., were completed in the field during the year. There were no failures. Alma Oil Co. opened the area at its 1 Deroin in May, which produced from the Wilcox at 3,888-91 ft.

Pauls Valley, discovered by the Pure Oil Co., proved to be a two-zone pool, producing from the Wilcox and the Pennsylvanian. Sixteen wells were completed in the pool during the year. Dry holes defined the north and south boundary but extensions to the northwest and on the east side were drilled during the latter half of the year with no limitations in sight as yet.

Pottawatomie County witnessed considerable wildcat activity. The Brooksville pool, discovered by Cities Service and Atlantic at their 1 Fort Cobb had eight oil wells and one failure as the year ended. Four miles south of Brooksville, Atlantic Refining Co. 1 Hamil opened the McComb pool. Both discoveries flowed in excess of 600 bbl. of oil a day from the Hunton lime.

The Anadarko basin and western Oklahoma, where considerable drilling and prospecting was carried out during 1941 and which appeared to be headed for more activity in 1942, was comparatively quiet. However, the restrictions on drilling probably accounted for the general slowup in operations. During the year the Apache pool of Caddo County was extended farther northwest, on what is known as the Apache trend. However, the greatest activity here was in the reworking of old wells. At the year's end, the field's engineering committee was working on plans for repressuring with gas produced with the oil but the indications were that the pressure was still too high for the reservoir to take back the gas. Similar tests were made in July and since that time the pressure had declined only 13 lb., during which time production held close to 8,000 bbl. daily. It was estimated that the pressure decline is 1 lb. to each 60,000 bbl. of oil produced.

Springer Discovery

A promising field brought into production as the year drew to a close and one which has attracted considerable activity, is the Ardmore Springer sand pool of Carter County. Discovered in October by Lloyd Noble at the 1-A Joliff, the well flowed 240 bbl. a day from a depth of 3,079-3,302 ft. A second well, Samedan Oil Co. 1 Tomlinson, flowed 497 bbl. in 12 hours. The Tomlinson well is one location north of the Joliff, but produces at a depth of 3,963-4,115 ft. Samedan Oil 1 Bussell, west offset to the 1 Tomlinson, was in the Springer sand section at 2,460-2,585 ft. and on drill-stem test showed an estimated 2,000,000 cu. ft. of dry gas. Top of the gas was 540 ft. higher than in the 1 Joliff and 1,480 ft. higher than in the 1 Tomlinson. The area should see extensive development during 1943.

The Cumberland pool of Bryan-Marshall counties continued its westward trend throughout the year. Pure's 1 Williams-109, SE NW 20-5s-7e, was reported as an extension to the field and in a new pay zone. Initial production was 427 bbl., through choke, at 5,472 ft.

OKLAHOMA

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Apache	20	19	45,235	0	1
Beebe and N	5	3	559	0	2
Brooksville	9	8	2,406	0	1
Byars	4	2	642	0	2
Cement	11	4	522	5	2
Centerpoint	2	2	42	0	0
Chickasha	5	0	0	3	2
Crescent	16	15	4,687	0	1
Cromwell and E	10	5	122	2	3
Cumberland	14	11	9,005	2	1
Dill	2	2	30	0	0
Dilworth	13	10	427	1	2
Earlsboro	11	7	1,446	0	4
Edmond, NE	8	5	225	1	2
Empire	9	5	284	0	4
Garber	6	5	133	1	0
Gurthrie townsite	7	4	1,142	0	3
Hewitt	12	5	521	0	7
Hotulke	38	34	8,715	0	4
Liberty and N	6	2	340	0	4
Loco and W	13	9	298	0	4
Lucien, NE	6	5	1,191	0	1
McComb	2	1	160	0	1
Navina, W	6	5	833	0	1
Oklahoma City	26	18	4,993	0	8
Pauls Valley	16	13	68,294	0	3
Sasakwa	5	4	59	0	1
St. Louis district	31	24	5,681	0	7
Spring	1	0	0	0	1
Tecumseh and E	3	2	432	0	1
Tussy	5	3	480	0	2
Tonkawa	5	2	109	0	3
Velma	20	16	264	1	3
Watchorn, E	11	11	6,061	0	0
Wewoka townsite	5	4	933	0	1
Woolsey	6	5	2,000	0	1
Misc. counties:					
Creek	97	59	1,840	7	31
Garfield	2	1	248	0	1
Le Flore	5	0	0	4	1
Muskogee	8	3	50	0	5
Okfuskee	33	14	1,461	2	17
Okmulgee	46	15	412	8	23
Osage	64	27	1,188	7	30
Pawnee	17	10	323	1	6
Pontotoc	7	2	100	0	5
Wildcats	315	50	15,745	12	253
Other	196	84	10,308	26	86
Total	1,159	535	199,946	83	541

Summary of Wildcats Completed in 1942

County—	Comp.	Oil	Prod.	Gas	Dry
Atoka	3	0	0	0	3
Alfalka	1	0	0	0	1
Caddo	6	0	0	0	6
Carter	6	2	1,331	0	4
Cleveland	2	0	0	0	2
Coal	1	1	125	0	0
Comanche	6	0	0	1	5
Cotton	2	0	0	0	2
Creek	13	2	125	0	10
Garvin	6	1	397	0	5
Grady	1	0	0	0	1
Grant	1	0	0	0	1

Make 'em last till VICTORY!

THE HIGHER STANDARD

TIME is an ally . . . every extra month, or week, or day of service you squeeze from your equipment is a step toward Victory. Conserve your cable tools in every way possible. Spang Cable-System Drilling and Fishing Tools are BUILT TO ENDURE if you take care of them.

SPANG & COMPANY, BUTLER, PA.

SPANG

THE BIGGEST NAME IN CABLE TOOLS

Field—	Comp.	Oil	Prod.	Gas	Dry
Harmon	2	0	0	0	2
Haskell	2	0	0	0	2
Hughes	13	1	47	2	10
Jackson	6	0	0	0	6
Jefferson	8	0	0	0	8
Kay	13	3	113	0	10
Kiowa	10	0	0	0	10
Latimer	1	0	0	0	1
Le Flore	1	0	0	1	0
Lincoln	25	1	35	0	24
Logan	11	3	1,262	0	8
Love	2	0	0	0	2
Marshall	6	3	2,625	0	3
McClain	1	0	0	0	1
McIntosh	5	0	0	1	4
Murray	2	0	0	0	2
Muskogee	3	0	0	0	3
Noble	11	5	2,816	0	6
Okfuskee	18	3	131	1	14
Oklahoma	8	2	376	0	6
Osage	11	0	0	0	11
Pawnee	9	2	2,617	0	7
Payne	13	3	207	0	10
Pittsburg	2	0	0	2	0
Pontotoc	11	1	314	0	10
Pottawatomie	29	10	2,654	1	18
Roger Mills	1	0	0	0	1
Seminole	24	5	407	0	19
Sequoyah	1	0	0	1	0
Stephens	13	2	163	0	11
Texas	1	0	0	1	0
Tillman	4	0	0	0	4
Total	315	50	15,745	12	253

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	123	57	7	59	441,056
February	116	53	17	46	395,911
March	99	44	7	48	284,808
April	98	40	8	50	312,094
May	88	42	4	42	287,840
June	85	43	2	40	296,212
July	108	50	7	51	387,825
August	58	24	3	31	209,600
September	115	55	11	49	402,844
October	73	32	3	38	245,671
November	71	32	7	32	247,762
December*	125	52	10	63	422,646
Total	1,159	524	86	549	3,934,269

*Five weeks.

Permian Basin

(Continued from Page 115)

at present may add some impetus and change the picture materially as it is drilling to the Clear Fork lime. If the lower pay is found productive, the outlook for the field will expand greatly.

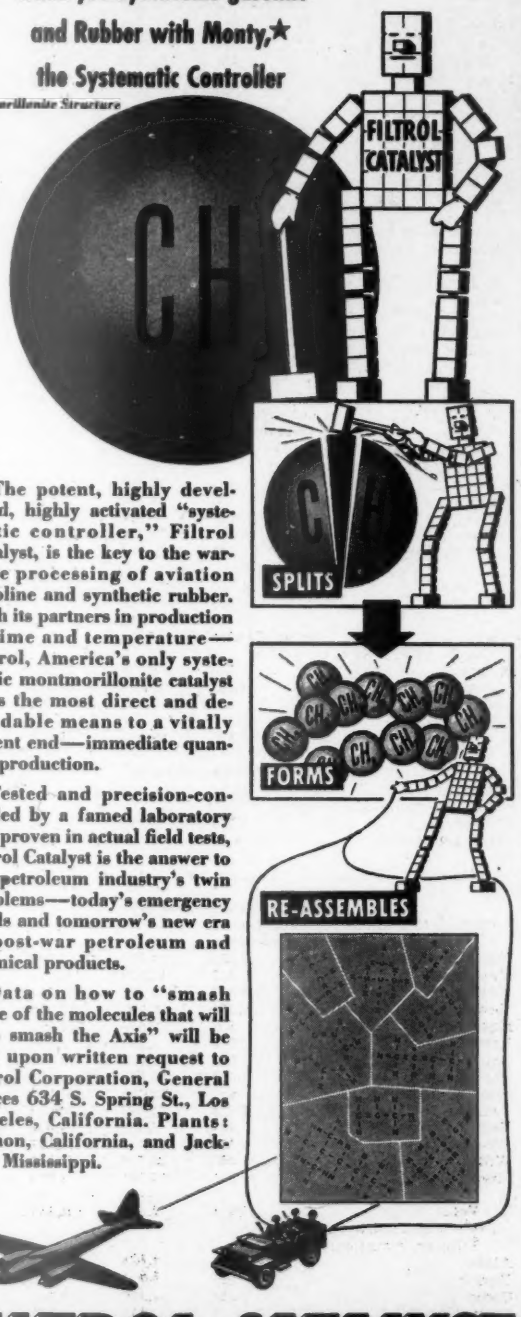
Wildcatting in the area was strong with a total of 59 exploratory tests being drilled. The prospecting was not confined to any one area but was distributed generally over the basin. Average depth of the wildcat wells drilled was 3,500 ft. which indicates that a large number of them did not penetrate anything like the complete section. Discoveries are listed in an accompanying table.

Generally, the entire Permian basin area was on the downward drilling trend along with the remainder of the country. Operators were not so hampered by the 40-acre spacing rule in the Permian basin as they were already on wide spacing but continuing and increasing pipe-line restrictions had the area bottled up. Operators are continuing to hope and go on developing properties against the time when other areas will be unable to supply the demand and will have to turn to West Texas for a crude supply.

Everything Under *Control*

when you synthesize gasoline and Rubber with Monty,★ the Systematic Controller

*Montmorillonite Structure



The potent, highly developed, highly activated "systematic controller," Filtrol Catalyst, is the key to the wartime processing of aviation gasoline and synthetic rubber. With its partners in production—time and temperature—Filtrol, America's only systematic montmorillonite catalyst—is the most direct and dependable means to a vitally urgent end—immediate quantity production.

Tested and precision-controlled by a famed laboratory and proven in actual field tests, Filtrol Catalyst is the answer to the petroleum industry's twin problems—today's emergency needs and tomorrow's new era of post-war petroleum and chemical products.

Data on how to "smash more of the molecules that will help smash the Axis" will be sent upon written request to Filtrol Corporation, General Offices 634 S. Spring St., Los Angeles, California. Plants: Vernon, California, and Jackson, Mississippi.

FILTROL CATALYST

to Speed Victory

EVERY single day almost four million Elastic Stop Nuts go into war production.

Even at that, and with all our expanded plant, it doesn't fill the demand.

It happens that the most urgent need right now is on aircraft. Every American plane that takes the air has some important part of its structure fastened with these strong, tight-holding nuts. Some types take as many as 35,000 in a single ship.

The reason is: *these nuts stay put under the toughest circumstances.*

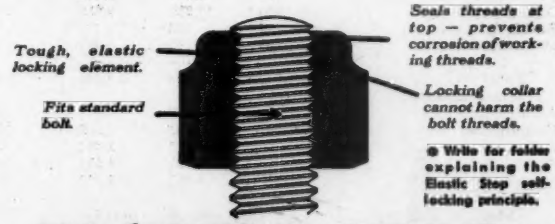
You handle them exactly like regular nuts. They go on fast, lock immediately and automatically.

There's no need of pins, washers or auxiliary locking devices.

Once on, they stay there—never shake loose. But you can take them off and put them back on many times and they won't lose their locking ability.

This is why there are more Elastic Stop Nuts on America's planes than all other lock nuts combined. And why they are also used in important structural applications on guns, naval vessels and other war equipment.

We have made billions of Elastic Stop Nuts and, as far as we know, not one has ever loosened.


Tough, elastic locking element.
Fits standard bolt.
Seals threads at top — prevents corrosion of working threads.
Locking collar cannot harm the bolt threads.

● Write for folder explaining the Elastic Stop self-locking principle.

ELASTIC STOP

SELF-LOCKING NUTS AND AIRCRAFT FITTINGS

ELASTIC STOP NUT CORPORATION

2330 Vauxhall Road, Union, N. J.

PRODUCTION AND RESERVES—OKLAHOMA

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Northeastern District				
Washington County	1,073	362,447	8,580	4,520
Nowata County	3,787		42,500	7,328
Rogers County	883		8,643	3,407
Osage County:				
Burbank	3,356	208,523	45,877	1,695
South Burbank	2,728	33,844	39,166	223
Naval Reserve	950	17,963	6,467	233
Other Osage	3,766	333,408	41,882	5,693
Total Osage	10,800	590,738	133,372	7,844
Total N.E. Oklahoma	16,543	953,185	193,095	23,099
East Central District				
Tulsa County	1,019	123,390	12,780	2,805
Wagoner County	228	7,217	2,443	401
Okmulgee County	1,295	106,629	13,081	7,919
Muskogee and McIntosh counties	221	12,084	1,296	461
Eastern Okfuskee Co.	1,140	57,856	11,774	404
Creek County:				
Bristow-Slick	1,777	138,786	18,154	1,099
Cushing-Shamrock	3,069	362,418	37,202	1,745
GlennSapulpa	1,527	255,091	20,879	1,848
Manford-Olive	418	11,298	3,652	423
East Stroud	170	713	1,127	45
Other Creek	1,075	25,819	7,371	553
Total Creek	6,036	794,125	97,385	5,719
Total E.C. Oklahoma	11,939	1,104,301	138,739	11,709
Greater Seminole District				
Seminole County:				
Bethel and North	425	5,850	1,180	61
Bowlegs	1,900	120,815	13,035	208
Carr City	662	31,473	3,667	78
Cromwell district	2,380	60,563	18,617	316
Dora	337	5,000	1,200	104
Earlsboro district	3,718	188,259	29,751	386
Keokuk	1,012	12,592	9,808	96
Konawa district	670	17,589	1,801	160
Little River district	2,333	131,763	12,917	297
Mission	352	27,825	1,275	61
Sasakwa	325	11,367	2,723	60
Searight district	534	38,569	2,571	72
Seminole district	2,654	152,076	22,734	318
Wewoka district	641	45,578	5,622	129
Grayson	203	2,062	1,538	33
Traugh	150	1,852	1,048	38
Allen	1,365	52,785	12,035	294
Miscellaneous	729	8,454	5,646	174
Total	20,580	914,672	147,168	2,885
Pottawatomie County:				
Asher and West	125	11,228	972	38
Avoca	205	1,415	985	17
Brooksville	197	197	1,803	7
Gray	331	4,687	2,643	26
Hotulke and West	832	1,021	7,979	24
Maud and South	377	12,750	1,220	68
McComb	27	27	813	2
Prague	252	811	1,689	17
Romulus	325	1,234	1,196	20
Shawnee district	411	3,336	2,414	51
St. Louis district	5,687	160,554	25,946	843
Tecumseh Lake	461	947	3,253	11
Tecumseh, East	191	511	1,089	9
Miscellaneous	351	2,294	2,506	118
Total	9,772	200,712	54,205	1,251
Okfuskee County:				
Dill and South	548	4,857	2,143	88
Olympic	490	11,882	2,618	314
Rusk	617	733	2,707	8
Miscellaneous	290	2,073	1,927	99
Total	1,945	19,545	9,395	509
Hughes County:				
Adams	254	1,578	1,872	10
Holdenville	192	5,452	2,308	109
Papoose	188	22,038	2,262	56
Fish	923	18,089	5,811	143
Miscellaneous	275	5,261	2,189	78
Total	1,832	52,418	14,442	396
McClain County:				
Byars	129	452	848	6
Pontotoc County:				
Bebee district	1,152	13,465	6,685	235
Fitts district	3,050	97,406	11,344	693
Jesse	650	5,617	4,883	55
Miscellaneous	135	2,813	907	288
Total	4,986	119,301	23,879	1,271
Coal County	33	171	189	7
Total Greater Seminole	39,286	1,307,271	250,126	6,325

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
North Central District				
Garfield, Grant, Kay and Logan counties:				
Blackwell	144	6,429	1,671	139
Billings	2,064	19,526	18,572	80
Braman	401	22,392	5,308	75
Crescent	752	14,211	3,129	47
Dilworth	281	5,550	2,450	77
Garber	611	55,750	8,750	538
Guthrie townsite	1,211	1,963	8,437	33
Liberty	116	116	744	3
Lucien	1,877	31,296	14,904	137
Polo	244	4,317	1,783	28
Tonkawa	601	121,966	6,634	177
Miscellaneous	1,260	62,625	12,375	284
Total N.C. Oklahoma	9,562	346,143	86,757	1,618
Central District				
Payne, Pawnee and Lincoln counties:				
Chandler & Hoyt	256	12,591	2,829	49
Coyle	1,660	4,175	9,425	36
ClevelandKeystone	278	42,932	3,338	443
Davenport district	239	12,281	2,689	125
Laffoon	201	2,076	1,804	13
Lauderdale	212	13,602	2,548	184
Ramsey	1,664	6,610	8,390	41
Sac & Fox	250	3,335	2,540	141
Stroud-Skellyville	182	10,861	2,209	37
Watchorn and East	487	7,976	5,024	27
Wilzetta and South	167	1,484	2,016	16
Yale district	788	41,263	8,957	325
Miscellaneous	1,129	37,285	12,448	374
Total	7,513	196,471	64,217	1,811
Oklahoma and Cleveland counties:				
Britton and South	121	2,651	558	23
Edmond and Northeast	1,136	19,174	4,576	88
Moore	291	8,594	806	23
Oklahoma City	26,484	573,398	134,932	845
Miscellaneous	160	728	772	13
Total	28,192	604,545	141,644	992
Total Central Okla.	35,705	801,016	205,861	2,803
West Central District				
Caddo and Kiowa counties:				
Apache	1,740	2,014	15,986	26
Cement	3,211	26,088	28,412	355
Hobart	385	1,333	4,067	25
Total W.C. Oklahoma	5,336	29,435	48,465	406
South Central District				
Bryan, Marshall and Love counties:				
Cumberland	2,776	5,712	54,288	58
Miscellaneous	35	1,529	321	178
Total S.C. Oklahoma	2,811	7,241	54,609	236
Southwestern District				
Carter, Comanche, Cotton, Garvin, Grady and Stephens counties:				
Duncan district	1,133	26,842	9,028	452
Graham-Fox	627	42,136	4,514	349
Healdton	2,827	193,379	31,741	1,885
Hewitt and West	3,304	96,105	12,695	907
Knox	553	15,653	3,997	176
Loco-Milroy	288	5,596	2,634	214
Pauls Valley	823	823	32,777	14
Robberson	310	15,339	3,661	166
Sholem-Alechem	852	38,728	7,272	306
Tatums-Tussy	1,638	21,967	10,433	312
Velma	439	6,546	4,824	649
Wildcat Jim	384	17,413	3,087	85
Wilters	283	25,713	2,437	223
Miscellaneous	394	17,141	3,859	512
Total	13,855	523,381	132,959	6,250
Jefferson, Jackson and Tillman counties:				
Altus	230	1,709	1,291	113
Tipton	165	1,840	1,060	57
Oscar	432	1,396	3,704	191
Seay	15	545	185	40
Spring	184	3,222	1,758	38
Frederick and West	599	2,771	1,729	32
Red River	99	1,510	890	82
Total	1,724	12,993	10,617	553
Total S.W. Oklahoma	15,579	536,374	143,574	6,803
Total Oklahoma	136,761	5,084,966	1,121,226	52,999

Western Side of Illinois Basin Produces Outstanding Fields of Year

by Herndon David

MATTOON, Ill. — Extensive and widespread exploration throughout the southern half of Illinois during the past year was successful in maintaining the state's extremely high discovery rate but was highly unsuccessful from the standpoint of uncovering large flush pools to bolster the rapidly declining production. Several fine fields were found but none were of the type of the Johnsonville, Woodlawn and Benton pools which were discovered in 1941. As a result, Illinois failed to maintain its oil reserves for the first time since 1937, and production hit its lowest level in 3 years. Total production for the year amounted to 106,282,000 bbl., a decrease of approximately 28,000,000 bbl. from that last year.

Amendments to federal drilling regulations made during the latter months of the year succeeded in slowing the decline rate but failed to allow for the characteristic, rapid development of new fields which is

(Continued on Page 134)

PRODUCTION AND RESERVES—ILLINOIS

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Centralia-Salem:				
Bartelso	177	1,194	1,063	64
Bluford	166	166	1,164	12
Boulder	374	374	2,816	26
Centralia	2,277	22,361	6,839	748
Cordes	418	2,134	5,016	131
Dix	636	3,005	2,545	81
East Patoka	653	1,342	2,619	56
Fairman	201	741	1,809	24
Hoffman	98	363	197	44
Irvington	753	2,300	1,506	82
Patoka	316	2,838	3,262	105
Roaches	80	419	641	10
Salem	14,705	166,998	48,202	2,363
Sandoval	231	4,861	699	49
Tonti	859	5,578	2,575	54
Woodlawn	2,997	5,531	6,009	148
Miscellaneous	461	4,626	2,564	191
Total	25,402	224,831	90,525	4,188
Louden area:				
Louden	17,961	87,680	107,720	1,946
Mason and South	172	326	1,724	31
St. James	1,477	5,661	4,439	183
St. Paul	79	83	397	13
Woburn	88	342	258	28
Miscellaneous	212	257	193	13
Total	19,989	94,349	114,731	2,214
Dale-Hoodville:				
Benton	5,391	12,381	10,789	229
Dale-Hoodville	5,294	12,244	15,586	356
North Benton	97	130	370	11
Rural Hill	3,738	5,353	6,947	171
Walpole	701	911	3,509	40
Miscellaneous	350	557	1,843	37
Total	15,571	31,576	39,044	844
Wabash River area:				
East Inman	541	1,007	4,323	66
Epworth	86	100	560	9
Iron	470	2,388	1,412	61
Keensburg Consol.	1,710	7,771	13,689	322
Mount Carmel	1,024	2,741	2,049	194
New Haven	126	298	272	21
New Harmony Consol.	7,224	18,953	28,667	704
Omaha	256	626	554	21
Phillipstown	182	307	2,093	39
Roland	1,889	2,993	7,557	135
South Maunie	608	979	1,241	62
Stokes	404	657	2,243	28
Storms	731	3,676	1,664	152
Miscellaneous	498	1,804	3,446	110
Total	15,749	44,300	69,770	1,924

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Clay City area:				
Aden	135	524	916	9
Albion	499	2,339	1,491	80
Barnhill	120	1,581	279	59
Bible Grove	286	286	2,024	32
Bone Gap	230	294	1,080	18
Boyleston	669	3,021	4,019	111
Burnt Prairie	171	326	854	20
Centerville	79	153	677	5
Cisne	182	2,641	1,459	46
Clay City Consol.	2,716	27,623	10,867	688
Coil	255	255	1,275	13
Covington	1,159	1,159	8,081	32
Dahlgren	126	807	243	40
Dundas	2,505	9,594	7,506	289
East Centerville	439	489	2,411	35
East Dundas	100	100	700	11
Flora and East	74	458	352	19
Geff	112	116	1,054	16
Johnsonville	5,146	10,677	15,443	247
Mayberry	99	105	385	6
Mill Shoals	896	2,552	2,688	110
Mount Erie	87	98	702	11
Noble	2,607	14,655	15,645	265
North Aden	270	2,755	815	61
North Boos	528	1,523	1,477	58
North Sims	75	75	445	6
Olney	113	1,219	681	34
Parkersburg	1,294	2,036	2,164	36
Ste. Marie	315	331	689	20
Sailor Springs	355	520	1,520	40
Sims	1,631	1,672	6,528	55
Stringtown	102	117	683	8
West Clay City	817	851	4,089	14
Miscellaneous	454	1,036	3,964	54
Total	24,546	91,988	103,186	2,528
La Salle anticline:				
Allendale	274	5,213	2,787	239
Bridgeport district	2,027	230,083	24,317	4,430
Casey district	385	53,502	4,698	4,918
Robinson district	1,391	148,712	16,888	9,021
Miscellaneous	254	256	604	16
Total	4,331	437,766	49,294	18,624
Others:				
Colmar-Plymouth	106	2,892	1,278	216
Dupo	128	1,692	608	72
St. Jacob	263	263	1,247	23
Miscellaneous	197	424	106	27
Total	694	5,271	3,239	338
Total Illinois	106,282	930,061	469,789	30,660

So long as they
are OVER THERE...
NSCO

☆ **THE STEEL Industry of America will require 6,000,000 tons of scrap, over and beyond the regularly available supply, during 1943 to convert into fighting steel for our military needs.**

It is not going to be an easy task to collect this 6,000,000 tons of scrap, for the Scrap Drives of 1942 collected the easily available scrap. It is available, however, in the homes, the manufacturing plants, on the farms and in the oil fields—but it will have to be *DUG OUT* to get it rolling to the scrap piles.

This is everybody's job—the private citizen in his home, the employer and employee in their business and in their manufacturing plants. It cannot be spasmodic—it must be constant if vital War Production is to be maintained.

THE NATIONAL SUPPLY COMPANY

Executive Offices: Pittsburgh, Penna. • General Sales Office: Toledo, Ohio • Division Offices: Fort Worth, Texas; Tulsa, Okla.; Torrance, Calif. EXPORT: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E. C. 2, *Limited Liability*.

necessary in Illinois due to the rapid decline of production from most of the producing formations. These amendments allowed an increase of nearly 50 per cent in completions during the latter half of the year, although completions for the year totaled only 1,809, as compared to 3,838 for the previous year. The most noticeable drop was in oil-well completions which amounted to 1,756, a decline of 60 per cent from the 1941 total.

Drilling activity, which has centered in counties on the eastern side of the Illinois basin for the past few years, gradually started to swing back to the Louden and Centrali-Salem areas during 1942 with considerable exploration being undertaken along the western rim of the basin. A great amount of deep drilling was undertaken in these areas with the Devonian and Trenton limes as the principal objectives. The results of these tests were the discovery of Devonian production in the Boulder and Bartelso South pools and the discovery of Trenton production in Madison County in what is now the St. Jacob pool. The closing week of the year also saw prospects of a considerable extension of Devonian production as the result of a reported 700-bbl. discovery in Christian County, more than 50 miles northwest of nearest Devonian production at Louden. This discovery, together with the St. Jacob discovery, climaxes several years of prospecting around the western rim of the deep basin which has resulted in numerous small shows in Montgomery and Bond counties but never in noteworthy production.

The Boulder pool, one of the best Illinois discoveries of 1942, was in reality discovered during the latter part of 1941, but remained idle until May of the past year. The first well drilled in the pool was drilled to the Devonian. On testing of this formation, the well blew off 250 bbl. of oil and then went to gas. The well was then shut in and no more tests were drilled in the field for nearly 5 months. The second well stopped in the Benoist sand where an initial production of nearly 400 bbl. daily was obtained, and all later wells were completed in this formation. However, during the latter months of 1942, an offset to the Benoist discovery was drilled to the Devonian where it was completed for approximately 700 bbl. of oil daily. This is the only Devonian well completed in the field to date but others are drilling and prospects are exceptionally good for excellent Devonian production in the field.

The St. Jacob pool in Madison County was discovered in May of the past year and is the most prolific Trenton field found in the state to the present time. Many of the wells completed in this field had initial productions of from 500-1,000 bbl. daily after acid treatment, an initial production above the average McClosky well and far above most of the sand wells completed in the state. To the end of the year, the St. Jacob field had produced 263,000 bbl. of oil, which places it among the top three discoveries of the year. The main importance of the pool, however, lies not in its contribution to the state's production total but in the new impetus it has given the Trenton limestone in Illinois. Until the St. Jacob discovery, the Trenton was considered an unimportant horizon and most operators would not bother to drill deep tests to this formation. Since the discovery, however, prospecting has increased to an unprecedented level along the western rim of the Illinois basin and considerable exploration for production from this formation is still under way.

The Devonian discovery in Christian County, although it promises to be one of the best of the year, had not been officially gaged at the end of the year and completion work was held up because of bad weather.

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	272	188	2	82	633,216
February	103	63	1	39	300,155
March	71	36	1	34	244,058
April	95	41	0	54	276,333
May	150	84	2	64	369,489
June	163	73	1	89	363,420
July	224	118	2	104	505,050
August	180	91	1	88	386,938
September	164	91	1	72	420,444
October	246	163	0	83	451,396
November	178	110	1	67	530,986
December	183	111	2	70	545,854
Total	2,029	1,169	14	846	5,027,339

Perhaps the outstanding discovery of the year in Illinois during 1942 was the Covington pool of Wayne County. This pool was discovered in the early part of August and by the end of the year had produced about 1,150,000 bbl. The field now has more than 1,200 proven acres and produces from the Aux Vases, Levias and McClosky. Only 32 wells have been completed in the pool to date, and had operators been able to develop the pool on a 10-acre basis and with the extreme rapidity which has been the case with other flush pools discovered in previous years, it would probably have produced nearly three times the amount of oil which was actually produced.

Among other 1942 Illinois discoveries noteworthy of mention are the Blairsville pool of Hamilton County and the Markham City (Bluford) pool of Jefferson County. Both pools produce from the Aux Vases and McClosky and are characterized by wells with high initial productions. The Blairsville field is along the general McClosky trend of the Clay City, Dundas, and Noble fields, while the Markham City pool lies on the western rim of this McClosky area. However, both discoveries are results of the extensive exploration carried on in the area in search of prolific McClosky production.

The area of the basin along the Wabash River dropped from first place among oil development and exploration areas in Illinois for the first time in many years during 1942. Several discoveries were made in this area during the year but all of them were small and did not add greatly to the state's reserves or production. Development of the known fields in the area also dropped almost to the point of becoming insignificant due to the close spacing of wells which has been common practice in these fields.

At the close of the year, principal activity in the state had shifted to Clay County where the discovery of the Iola pool was attracting considerable attention. This pool, in 15-5n-5e, has possible production from three formations, the Cypress, Aux Vases, and McClosky. Only a few wells have been completed in the field, but results obtained from these wells lead to the belief that the field will be one of the highlights of development during the coming year.

In addition to the new producing areas discovered during 1942, Illinois has apparently added another new pay to its already long list in the Chester series. This new pay is the Glen Dean limestone in about the middle of the series. This formation had previously shown small quantities of oil in some areas of the state but none had been even sufficient to encourage testing. The exception to this rule is in the South Sailor Springs pool of Clay County which produces mainly from the Tar Springs and Cypress. A well in this pool recovered approximately 2,000 ft. of clean oil on a drill-stem test of the Glen Dean but operators decided to drill deeper to explore other formations before further testing this new pay. Since the Glen Dean lies above the Tar Springs and Cypress, it cannot be expected to cover a large area in the pool.

In the opening weeks of the new year, Devonian production was found in the old Patoka field of Marion County. Only gage released on the well showed that it had swabbed at the rate of 12 bbl. an hour, thus assuring additional exploration of this formation in the pool. Marion County which, similar to many other counties on the western side of the basin, has undergone a period of quiet during the past 2 years may again receive an active development campaign in 1943 should the Devonian produce as prolifically at Patoka as is expected.

With the extension of Order M-68-5 into the opening month of the new year and expectations of a further extension, and with such discoveries as the Iola and Patoka-Devonian pools awaiting development, Illinois operators are looking forward to a

much better year than was experienced during 1942. Prospecting during 1943 will probably again center in the McClosky areas of Wayne, Clay, Richland, Hamilton, and Jasper counties, but much work will probably continue throughout the western side of the basin with considerable Devonian drilling undertaken in the Louden and Centralia-Salem areas.

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Aden	4	2	211	0	2
Akin	3	2	137	0	1
Allendale	22	11	631	0	11
Benton	12	10	678	0	2
Bible Grove	39	30	3,943	0	9
Blairsville	15	10	1,992	0	5
Bluford	16	12	2,296	0	4
Bone Gap	18	13	1,600	0	5
Boulder	30	26	3,325	0	4
Boyleston	2	2	57	0	0
Centralia	2	2	170	0	0
Clay City	22	19	2,169	0	3
Coil	20	13	2,482	0	7
Cordes	3	3	45	0	0
Covington	24	23	11,016	0	1
Dale-Hoodville	89	74	17,438	0	15
Dix	3	3	65	0	0
Dundas	45	39	7,264	0	6
Dupo	6	5	155	0	1
East Centerville	29	24	4,670	0	5
East Centralia	4	2	79	0	2
East Dundas	17	11	3,305	0	6
East Inman	13	12	1,144	0	1
East St. Francesville	4	4	145	0	0
Epworth	4	3	135	0	1
Fairfield	13	10	2,423	0	3
Flora	3	2	110	0	1
Friedsville	10	6	406	0	4
Grayville	10	7	738	0	3
Griffin	17	15	3,060	0	2
Inman	11	8	674	0	3
Iola	5	3	309	0	2
Iron	6	5	858	0	1
Irvington	10	9	396	0	1
Jeffe	18	13	2,600	0	5
Johnsonville	31	26	5,268	0	5
Keensburg	15	12	542	0	3
King	7	5	621	0	2
Louden	42	35	4,779	0	7
Mason	6	2	272	0	4
Maunie	4	2	143	0	2
Mayberry	12	6	2,238	0	6
Mill Shoals	26	21	1,798	0	5
Mount Carmel	13	10	1,118	0	3
Mount Erie	13	9	3,157	0	4
New Harmony	58	53	6,301	0	5
New Haven	3	2	87	0	1
Noble	32	23	2,898	1	8
North Benton	9	6	474	0	3
North Boos	11	10	4,323	0	1
North Inman	1	1	142	0	0
North Sims	8	6	667	0	2
Olney	4	2	383	0	2
Parkersburg	22	14	7,066	0	8
Patton	4	2	65	0	2
Phillipstown	29	28	4,311	0	1
Roland	49	45	4,153	0	4
Rural Hill	87	76	14,381	0	11
Russellville	4	0	0	4	0
Sailor Springs & South	14	10	415	0	4
St. Jacob	25	23	4,909	0	2
St. James	2	2	56	0	0
Ste. Marie	17	14	2,577	0	3
St. Paul	12	11	679	0	1
Salem	2	2	98	0	0
Sims	51	45	10,652	0	6
South Mason	23	22	1,387	0	1
South Maunie	20	14	993	0	6
South Lawrence	38	29	2,821	0	9
Stokes	4	4	310	0	0
Storms	6	3	477	1	2
Stringtown	7	6	565	0	1
Walpole	21	16	2,504	0	5
West Centralia	4	2	140	0	2
West Clay City	15	10	5,339	0	5
Woodlawn	16	9	648	0	7
Wildcats	607	85	12,173	5	517
Miscellaneous	106	33	4,278	3	70
Total	2,029	1,169	195,934	14	846

"TOLEDO"

TOOLS HAVE GONE TO WAR.

We are sorry if we are unable to serve our old customers, the plumbers, steamfitters and engineers of America, as we have in the past, but we are indeed proud to have "TOLEDO" tools chosen to take such a prominent part in America's war effort.

"TOLEDO" tools have gone and are going to our many outposts in this World War, Midway Island, Australia, Hawaiian Islands, Alaska, Newfoundland, Africa, and the British Isles. Here in America hundreds are being shipped to new air bases, army camps, naval bases, shipyards, ordnance plants, and our new synthetic rubber plants.

Yes, "TOLEDO" tools have gone to war and we are proud of this fact. We know "TOLEDO'S" hundreds of thousands of old-time users will understand and excuse us when we say prompt shipments cannot be made of orders with low priority ratings, for America's war orders of course have the right of way.

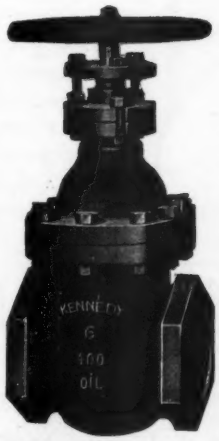
When Victory comes and peace time projects are again resumed, "TOLEDO" will once more be ready to serve you as in the past.

Safeguard your tools, give them the best of care, regrind dies when dull and order repairs only when necessary. We will try and take care of your needs.

THE TOLEDO PIPE THREADING MACHINE CO.
TOLEDO, OHIO NEW YORK OFFICE, NO. 2 RECTOR ST.

"TOLEDO"

From 300-lb. test to 1600-lb. test



a gate valve for every oil and gas industry service

THE KENNEDY LINE OF VALVES for the oil and gas industry includes types for low, medium, extra heavy and extreme pressures, with screwed or flanged ends, and with stationary or rising stems. Each type is designed with special reference to service requirements in oil and gas fields, refineries, pumping stations, pipe lines and distribution systems. Bodies are heavily proportioned with exceptional strength and rigidity; disc mechanisms have thoroughly proven their easy and positive operation; stuffing boxes, flanges and pipe end hexes are exceptionally deep. Standardizing on Kennedy Valves assures dependable operation and lastingly reliable service no matter what may be the fluid, pressure, temperature or frequency of operation.

The Kennedy Valve Mfg. Co., Elmira, N.Y.

KENNEDY

VALVES-PIPE FITTINGS-FIRE HYDRANTS

Oil Resistance—

ONE OF THE GREAT ADVANTAGES OF SYNTHETIC RUBBER

ASK the tanker crewmen who have drifted for days on the sea in a little rubber boat . . . sloppy with the oil that rots rubber. They can testify to the practical value of the oil-resistant *synthetic* rubber that coats the fabric of such boats.

Ask the fighter pilot to whom synthetic rubber means fuel tanks that seal their own bullet wounds, leakproof fuel pumps, oil lines and hydraulic systems. He understands the importance of oil-resistant synthetic rubber, for his life depends upon it.

Of all the special qualities, such as resistance to heat, abrasion, compression-set and sub-zero cold, that 16 years of development work enable us to give Hycar synthetic rubbers, resistance to the deadly deteriorating effects of petroleum products is one of the most valuable.

When the vast requirements of war have been met, manufacturers in every industry will have available a truly All-American rubber, versatile, far more useful and longer-lived than tree rubber ever was; a rubber that's laboratory controlled and tailor-made to meet a thousand different individual needs. *Hycar Chemical Co., Akron, Ohio.*

Available Now for Experimental Work

Although the entire output of Hycar is allocated by the War Production Board, government regulations permit us to sell up to 200 pounds of Hycar per month to customers doing experimental work. Hycar maintains a fully staffed and equipped Customer Service Laboratory to help your supplier of rubber products develop products for you of Hycar synthetic rubber.

HYCAR

SYNTHETIC RUBBER

NORTH CENTRAL TEXAS

Bend and Mississippian Pays Yield Many Discoveries

by Harry F. Simons

NORTH TEXAS proved to be one of the strongest areas in the country during the past year, completions holding up well following the drop from an almost record high in January. Reason for the sustained interest in the area is availability of pipeline outlets plus the fact the area generally produces a desirable type crude.

There were 105 wildcat wells completed during the year with 41 of them opening new pools or extending old ones. Deeper exploration was the objective as 35 of the new producing areas were below 3,500 ft. The Bend lime series in the Pennsylvanian was the principal objective and discoveries in it were obtained in Wasson, Forestburg, Sanders, Joy, Hoefle, Spring, Worsham-Steed, East Bryson, Eanes, McKnight, Park Springs, Kisinger, Garvey, Daws, and Hobart pools.

Mississippian pays also attracted prospectors and give a bright future to further development in the area. Fields discovering pays in the Mississippian include: Joy, Alma, Mathews, Padgitt, Ragland, and Knox. Discovery wells and exploration wells completed in the Mississippian show a good initial, averaging in the neighborhood of 1,000 bbl. per day.

Ordovician Prospects

Deep Ordovician prospects were not without their attractions and a number of tests to that horizon were completed. The deep prospecting was not confined to any one area but was well distributed over the basin. Principal pays in the Ordovician are the Ellenburger and the Simpson sand and dolomite. The single biggest development was the expansion of Ellenburger discovery of last year at K.M.A. which added 2,400 productive acres with 59 successful wells and no dry holes. Ellenburger discoveries include Browning pool in Archer County, the Post Oak in Jack County, and Potts-Ellenburger in Wilbarger County. The Mueller pool in Montague County and the Hildreth pool in Montague were proven productive in the Simpson.

Encouraging because of future possibilities but not yet proved productive was the established presence of the Viola lime, a formation which yields considerable oil in Kansas and Oklahoma. A well drilled in Montague County was reported as having penetrated a formation definitely classified as Viola.

The Strawn sand continued to be a favored objective and successes in that pay zone were quite numerous. This pay is widespread over the area and often produces in fields which have production in the Caddo and Marble Falls lime and other deeper pays. Principal Strawn developments during the year were the discoveries at Joy in Clay County, Illinois Bend pool in Montague County, Mount View pool in Montague, Ketchum pool in Montague County, Talbot pool in Young County, and the Watson pool in Clay County. The Strawn development will continue to be centered around Clay County.

The Forestburg pool, which pro

PRODUCTION AND RESERVES—NORTH TEXAS

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Archer County:				
Caddo	165	165	2,835	21
Hull-Silk	3,819	11,176	48,824	420
Kadane	376	540	4,220	24
Mankins	193	589	2,111	14
Scotland	222	343	2,357	19
Miscellaneous	2,983	135,341	34,719	3,289
Total	7,758	148,154	95,066	3,787
Baylor County:				
Portwood	157	5,071	1,829	127
Rendham	83	148	852	14
Seymour	363	884	5,116	32
Total	603	6,103	7,797	173
Cooke County	2,224	25,197	28,163	1,189
Voth	*159*	*526*	*2,074*	*60*
Walnut Bend	*781*	*3,412*	*9,788*	*130*
Miscellaneous	*1,314*	*21,259*	*16,301*	*999*
Foard County:				
Johnson	73	1,695	1,705	11
Miscellaneous	12	357	743	5
Total	85	2,052	2,448	16
Jack County:				
Bryson	926	2,523	18,477	158
Hoefle	126	132	2,868	11
Miscellaneous	913	17,892	13,546	597
Total	1,965	20,547	34,891	766
Wichita County:				
Burkburnett-Iowa Park	1,735	135,321	19,679	....
Electra	2,570	143,678	27,322	....
K.M.A.	11,219	34,384	254,496	1,764
Miscellaneous	172	47,437	1,813	5,566
Total	15,696	360,820	303,310	7,330

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Clay County:				
Antelope	459	783	6,217	53
Halsell	147	351	3,399	11
Joy	113	113	1,677	5
New York City	117	153	2,947	8
Ross	146	239	4,561	18
Miscellaneous	1,347	11,548	21,012	902
Total	2,329	13,187	39,813	997
Montague County:				
Bonita	236	643	7,357	20
Bowers	337	723	7,277	32
Forrestburg	97	97	2,783	6
Ringgold	233	422	6,338	15
Rogers and Rogers	433	1,623	13,377	47
Miscellaneous	1,695	35,085	33,887	975
Total	3,031	38,593	71,019	1,095
Wilbarger County:				
Consolidated	280	1,056	3,424	36
Fargo	694	1,036	8,404	46
Harrold	81	113	1,087	9
Rock Crossing	232	348	2,372	47
Miscellaneous	2,226	76,723	23,987	1,587
Total	3,513	79,276	39,272	1,725
Young County:				
James	174	484	5,516	51
Knight	246	4,068	3,332	41
Knox	261	540	7,460	48
Lipton-McKnight	85	551	1,349	21
Sewell	246	816	2,984	41
Miscellaneous	2,592	69,413	29,257	2,244
Total	3,604	75,872	49,898	2,446
Total North Texas	40,808	769,801	671,679	19,524

JOHN ZINK BURNERS

WILL

"Add Another Still"

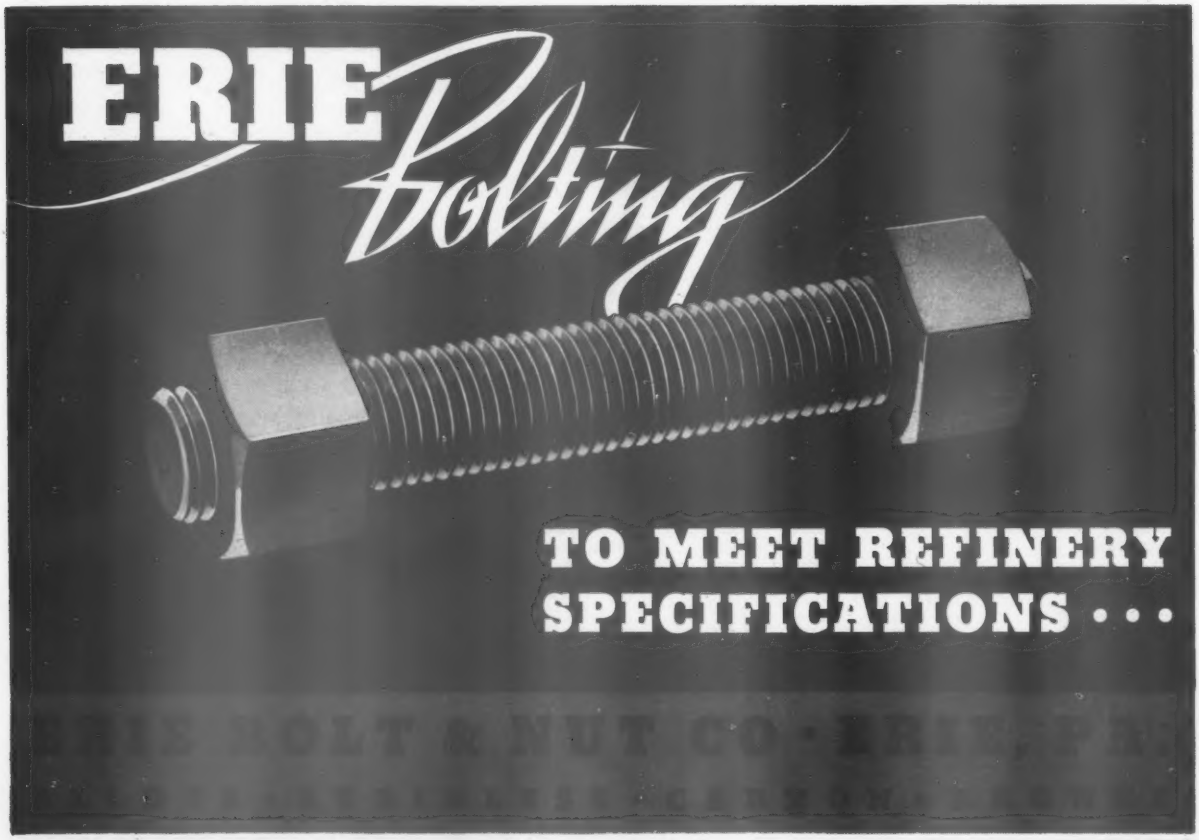
You can increase present capacity—with little expense—and use the least amount of critical material by: Changing to John Zink Burners, by adding a John Zink Burner or by increasing the heat liberation of your present John Zink Burners—without danger of impingement on tubes.

Heat When You Want It—Where You Want It.

Write for descriptive bulletins.

JOHN ZINK COMPANY... TULSA, OKLA.

NEW YORK . . . LOS ANGELES . . . SAN FRANCISCO . . . DETROIT



duces from the Bend Marble Falls lime, a major discovery for the year, has been defined on the east but is still open for expansion on the other sides. At the end of the year there were seven successful completions in the pool.

The Hoefle pool in Jack County, also a Bend pool, continues to be extended on the south and southwest with a total of 11 oil wells completed during the year. There were three dry holes completed but these were on the north and west sides.

Principal reserves added were in the Watson, Forestburg, Padgitt, Joy, K.M.A., Strawn and Ellenburger, New York City, Ringgold (including Spring pool), and Ross. However, scattered fields in which there were only one or two new wells added augmented the reserves in the area. Thus the pools which have too small an additional reserve to list separately amount to approximately nine times those which show an appreciable reserve. This one fact reveals the character of the North Texas Strawn, or Fort Worth basin, a number of quite small pools which in the aggregate amount to a considerable supply of oil.

Due to the favorable geographical location of the area and the encouraging results of the deeper exploration during 1942 the activity during the coming year should compare rather favorably with the last 11 months of 1942.

NORTH TEXAS DISTRICT

Summary of Wells Completed During 1942

Field, county—	Comp.	Oil	Prod.	Gas	Dry
Wildcats	105	13	2,357	1	91
Allar, Young	2	1	575	1	0
Antelope, Clay	6	6	2,936	0	0
Sanders, Montague	3	3	3,960	0	0
Benson, Montague	1	1	275	0	0
Bowers, Montague	3	1	65	0	2
Bowie, Montague	1	1	417	0	0
Briar Creek, Young	4	1	58	1	2
Bryson, Jack	3	0	0	0	3
Bryson-Marble Falls, Jack	1	1	29	0	0
Bunger, Young	2	1	52	0	1
Burkburnett, Wichita	14	6	195	0	8
Burns-Larrimore, Young	3	1	626	0	2
Burns-Williams, Young	1	1	100	0	0
Clingingsmith, Montague	5	5	2,140	0	0
Castleberry, Wilbarger	1	1	195	0	0
Coleman, Archer	2	2	82	0	0
Consolidated, Wilbarger	5	4	325	0	1
Cooper-Knight, Archer	1	1	131	0	0
Craig, Young	1	1	35	0	0
Electra, Wilbarger-Wichita	2	1	5	0	1
Fargo, Wilbarger	2	1	175	0	1
Fish Creek, Young	1	0	0	1	0
Forestburg, Montague	7	7	7,497	0	0
Howard, Montague	2	1	400	0	1
Graham, Young	1	1	24	0	0
Griffin, Archer	2	2	587	0	0
Halsell, Clay	3	2	192	0	1
Hapgood, Clay	1	0	0	0	1
Harrold, Wilbarger	6	5	1,131	0	1
Herron City, Young	1	1	60	0	0
Hoefle, Jack	14	11	5,184	0	3
Housley-McCord, Throckmorton	4	3	119	0	1
Hull-Silk, Archer	6	5	438	0	1
Hults-Owen, Montague	1	1	600	0	0
Iola Park, Wichita	6	3	117	0	3
James, Young	5	3	707	0	2
Jermyn, Jack	1	0	0	0	1
Jay, Clay	7	5	5,212	0	2
K.M.A., Wichita	45	37	12,351	0	8
K.M.A., Ellenburger	59	57	48,385	1	1
Knight, Young	1	1	965	0	0
Knox, Young	5	5	875	0	0
Knox (Miss. lime), Young	1	1	1,180	0	0
Loving, Young	4	1	70	0	3
Mankins, Archer	2	1	41	0	1
Mathis, Jack	2	2	117	0	0
McKnight, Throckmorton	3	1	27	0	2
Mueller, Montague	1	1	440	0	0
Nebraska, Clay	1	0	0	0	1
New York City, Clay	6	5	4,773	0	1
Osburn, Cooke	1	0	0	0	1
Padgitt, Young	5	3	4,344	0	2
Petrolia, Clay	9	1	16	0	8
Pitzer & West, Jack	1	1	52	0	0
Potts, Wilbarger	3	2	1,279	0	1
Ragland, Young	2	2	1,189	0	0
Ringold (includes Spring), Montague	11	8	2,104	0	3
Rock-Crossing, Wilbarger	4	3	757	0	1
Rock-Crossing, Ellenburger	4	4	1,873	0	0
Rogers & Rogers, Montague	2	1	985	0	1
Ross, Clay	8	8	3,587	0	0
Scotland, Archer	7	7	4,463	0	0
Sewell, Young	9	5	653	3	1
Seymour, Baylor	4	2	141	0	2
Deer Creek, Clay	1	1	43	0	0
Stoneburg, Montague	2	1	94	0	1
Thornberry, Clay and Wichita	48	15	586	0	33
Voth, Cooke	3	1	25	0	2
Walnut Bend, Cooke	8	8	2,270	0	0
Watson, Clay	7	7	1,587	0	0
Webb, Jack	1	1	71	0	0
Worsham-Steed, Jack	2	2	238	0	0
Miscellaneous:					
Archer County	63	33	1,783	0	30
Clay County	28	19	812	1	8
Cooke County	22	9	332	0	13
Jack County	3	1	120	0	2
Montague County	6	2	288	0	4
Throckmorton County	13	5	134	0	8
Wichita County	29	10	182	0	19
Wilbarger County	4	3	129	0	1
Young County	37	16	1,124	0	2
Total	713	397	1,124	6	301

Wimberly Expansion Leads In West Central District

DEVELOPMENT in the West Central Texas area was centered around the Wimberly pool in south central Jones County which added 29 new oil wells out of 35 completions and was pretty well defined as far as area was concerned. Producing formations in the field are the lower Tannehill sand, Flippen sand, Flippen lime, lower Hope lime, a stray lime which is probably Bluff Creek, Brook-

PRODUCTION AND RESERVES—WEST CENTRAL TEXAS

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Brown County	477	31,299	5,711	831
Callahan County	294	15,231	2,559	1,155
Coleman County:				
Novice-Goldsboro	325	943	3,247	58
Silver Valley	97	97	2,303	12
Miscellaneous	371	11,156	4,444	336
Total	793	12,196	9,997	406
Comanche County	93	1,810	1,090	118
Eastland County	719	71,688	7,902	426
Erath County	26	4,226	254	15
Jones County:				
Akard	122	266	2,134	27
Avoca and North and West	418	2,244	4,906	65
Griffin	429	2,136	5,484	68
Hawley	100	3,249	1,101	63
Lewis-Steffens	377	2,508	4,622	191
Sayles	289	2,376	3,824	79
Wimberly	174	210	2,790	42
Miscellaneous	451	10,000	5,050	196
Total	2,360	22,989	29,911	671
Fisher County:				
Rotan	123	1,393	1,467	32
Royston	394	11,722	4,728	99
Miscellaneous	54	268	1,322	9
Total	571	13,383	7,517	140
Haskell County	17	207	176	10
Palo Pinto County	96	5,166	964	131
Shackelford County:				
Ivy	342	1,892	4,788	79
Nail	85	538	932	18
Miscellaneous	1,251	41,530	12,900	1,905
Total	1,678	43,960	18,620	2,002
Stephens County	1,036	129,980	12,360	611
Stonewall County	28	159	261	5
Taylor County	186	793	3,087	58
Throckmorton County	272	3,868	2,622	247
Total West Central Texas	8,646	357,233	103,027	6,826

over lime, and the Gunsight lime.

Late in the year one well was treated with 2,000 gal. of acid in the lower Hope lime and the results were quite phenomenal. The well's production increased from 20 bbl. per day to 500 bbl. per day. Whether this is a freak case or whether it will be the rule with the wells in the lower Hope is not yet known. Other wells in the field producing from the lower Hope have not been treated with acid, this technique being postponed until production in the area dropped. Other lime pays have not been treated with acid but probably will be in the near future.

The Coker pool in Coleman, a 1942 discovery, producing from the Morris sand in the Strawn series at about 3,000 ft., had six wells at the close of the year. There were two dry holes in the pool which limit it to the south and west. The structure is believed to be small and on 40-acre spacing the future drilling to the north and east will probably be taken care of with comparatively few wells.

Taylor County Discovery

Major discovery for the year was the Reddin pool in Taylor County which was found productive in the lower Hope lime of the Cisco series at approximately 2,250 ft. The discovery well, Butler & Horne Drilling Co. et al 1 S. M. Reddin, 12 miles northwest of Abilene, flowed 250 bbl. in 7 hours from pay 2,248-50 ft. The discovery well was completed in September and there are now two dry holes and four oil wells. The dry holes are both on the south end of the pool. Future development will probably be principally to the north with some expansion east and west.

There were a total of 11 new pools discovered in the area and with the exception of the two mentioned above, none are outstandingly important. One of the discoveries occurred late in the year and it brightened the prospects in Callahan County. It was the Anderson-Prichard 1 Sealy-Smith Foundation, Section 121, Block 2, G.H. &H. Survey, 3 miles southeast of Oplin. The discovery produced 88 bbl. per day from 4 ft. of Morris sand topped at 3,051 ft. There was one test drilling in the pool at the end of the year.

WEST CENTRAL TEXAS

Summary of Wells Completed During 1942

	Comp.	Oil	Prod.	Gas	Dry
Akard, Jones Co.	6	4	518	0	2
Amity, Comanche	3	2	44	0	1
Aspermont, Stonewall	1	1	54	0	0
Avoca, Jones	4	2	651	0	2
Beddo, Runnels	1	1	10	0	0
Bailey, Coleman	1	1	85	0	0
Blackwell, Coke	1	1	175	0	0
Bridges, gas, Coleman	1	0	0	1	0
Coker, Coleman	8	6	2,111	0	2
Cook, Shackelford	14	9	757	0	5
Corbett, Stephens	2	2	207	0	0
Donnell, Stephens	1	1	78	0	0
Dunigan, Taylor	1	1	84	0	0
Duster, Comanche	1	1	20	0	0
Elliott, Shackelford	2	2	109	0	0
Grogan, Jones	1	1	110	0	0
Jim Ned, Coleman	8	5	822	1	2
Lawson, Haskell	1	0	0	0	1
Lewis, Jones	4	1	148	0	3
Loving, Stephens	3	3	43	0	0
McCaulley, Fisher	7	4	587	0	3
McMillan, Runnels	4	3	188	0	1
Merkel, Taylor	5	3	2,730	0	2
Nail, Shackelford	8	6	458	0	2
Noodle, Jones	3	1	13	0	2
N. Novice, Coleman	3	3	241	0	0
Reddin, Taylor	6	4	2,257	0	2
Sayles, Jones	1	0	0	0	1
Scranton, Callahan	1	1	100	0	0
Silver Valey	5	3	187	0	2
Smith-Morgan, Comanche	3	3	80	0	0
S. Noodle, Jones	2	2	38	0	0
Stith, Jones	1	1	266	0	0
Strawn, Palo Pinto	4	0	0	1	3
Trent, Taylor	4	2	273	0	2
Triplett, Jones	1	0	0	0	1
View, Taylor	1	0	0	0	1
Thompson, Coleman	1	0	0	1	0
Wimberly, Jones	35	29	9,607	0	6
Wildcats	87	1	20	3	83
Miscellaneous:					
Brown County	17	7	75	6	4
Callahan	7	3	84	0	4
Coleman	3	0	0	1	2
Comanche	1	1	33	0	0
Eastland	4	2	15	0	2
Jones	2	2	17	0	0
Palo Pinto	4	3	123	1	0
Shackelford	7	5	83	1	1
Stephens	6	2	85	2	2
Taylor	1	1	10	0	0
Total	298	136	23,596	18	144

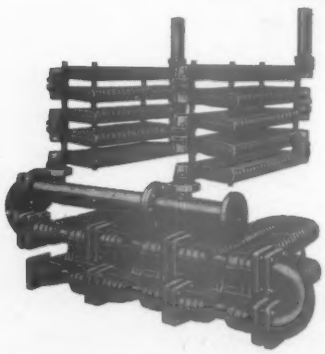
OK you asked for it!

MANUFACTURE OF STERLING SECTIONS RESUMED

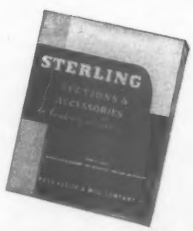
STERLING Condensing and Cooling Sections, and essential accessories are being manufactured again. They're available for immediate shipment.

This is Ross' direct answer to a long list of past users (in petroleum, gas and chemical industries) who must revamp and enlarge their installations, and who need heat exchangers *fast!*

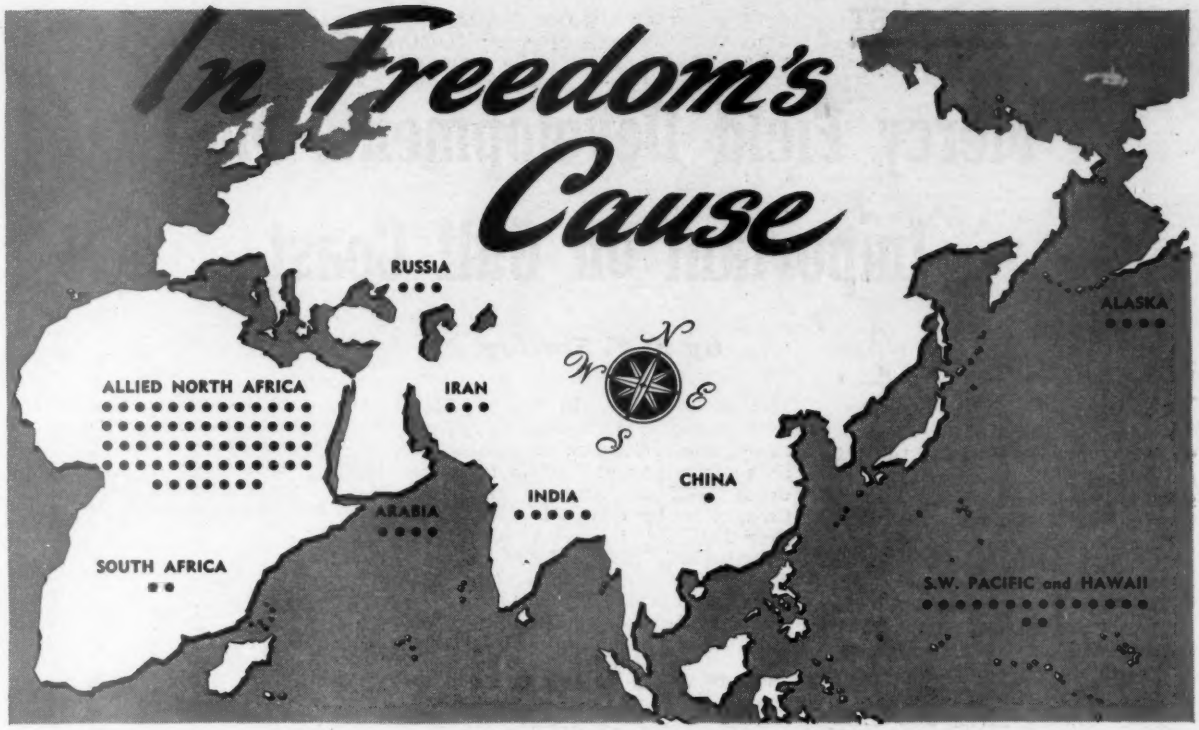
Because no critical materials are required, (completely Arco Cast Iron) fabrication of STERLING Sections has been encouraged and supported by the Heat Exchanger Branch, W. P. B. and the office of Petroleum Co-ordinator.



All the data you need in new 12-pg. BULLETIN 3626 Write at once for your free copy and price list



Manufactured by AMERICAN Radiator and "Standard" Sanitary Corporation
Sold Exclusively by
ROSS HEATER & MFG. COMPANY, Inc.
Division of AMERICAN Radiator and "Standard" Sanitary Corporation
GENERAL OFFICES AND PLANT—BUFFALO, N. Y.



MARLEY COOLING TOWERS serve United Nations fighters and war industries on all fronts.

In addition to the great number of Marley Cooling Towers now speeding American war production, this map indicates recent Marley exports for service in the active war zones.

FACILITIES and "KNOW-HOW" to do the Job Speedily and Right

America's ability to expand its productive capacity so enormously and so quickly has saved the world from disaster . . . . by producing the *right* equipment to do each job that has to be done . . . . and *ahead of schedule.*

As an example, Marley's production at the start of 1943 is *triple* the same figure for 1942, which was *double* that for 1941 . . . . all on war-vital contracts.

Because Marley had the facilities to swell output swiftly, plants producing essential war supplies have not suffered delay for want of water cooling equipment. And because Marley had the special knowledge and experience to engineer each installation specifically for its job, these plants save much in operating cost and maintenance man-hours.

These facilities and this specialized experience have proved to be a definite national asset, and Marley productive capacity is still ahead of demands!

1-43-A

MARLEY COOLING TOWERS

Every MARLEY TOWER *is individually engineered by* THE MARLEY CO., INC. — KANSAS CITY, KANSAS

Mercy Field Developments Most Important on Gulf Coast

by T. F. Smiley

ALTHOUGH other areas of importance were added to producing territory along the Gulf Coast in 1942, the opening of the Mercy Wilcox sand field in San Jacinto County in the first month of the year is credited with retaining its place at the head. This well, 1 Central Coal & Coke Co., in the James Robinson Survey, was brought in by Shell Oil Co., Inc., at 8,273-79 ft., total depth 8,321 ft. Its initial production was 583 bbl., and it gave San Jacinto County a clearly defined place on the state's oil map.

Other ventures in the new Mercy field later in the year met with more than a fair measure of success, only one out of eight tests coming in dry. The best production record among these later wells was 720 bbl. and the lowest was 168 bbl. With the exception of Joe's Lake field, in Tyler County, the Mercy field is believed to embrace a larger area of the Wilcox sand than any other in the Gulf Coast territory.

Summary of Wildcats Completed in 1942

County—	Comp.	Oil	Gas	Dry
Angelina	1	0	0	1
Austin	3	2	0	1
Brazoria	5	0	0	5
Brazos	1	0	0	1
Chambers	2	1	0	1
Fayette	1	0	0	1
Fort Bend	8	0	0	8
Grimes	6	0	0	6
Harris	16	1	0	15
Houston	1	0	0	1
Jackson	29	5	0	24
Jefferson	2	0	0	2
Liberty	3	0	0	3
Matagorda	10	1	1	8
Montgomery	4	0	0	4
Newton	2	0	0	2
Polk	2	0	0	2
San Jacinto	1	0	0	1
Trinity	2	0	0	2
Tyler	4	1	0	3
Victoria	1	0	0	1
Walker	5	0	0	5
Waller	1	0	0	1
Wharton	11	0	0	11
Total	121	11	1	109

Besides the Mercy pool in San Jacinto County, new fields, new sands, or pool extensions were found in Austin, Harris, Jackson, Matagorda, Tyler, Colorado, Jefferson and Livingston counties.

Among the year's discoveries was Ohio Oil Co. 1 McDonald, which opened the North Bay City field in Matagorda County, in August. This well, in the J. Betts Survey, flowed at the rate of 309 bbl. through ⅛-in. choke from pay at 7,870-73 ft., total depth 8,692 ft. Another discovery brought in by Ohio Oil Co. was 1 Roy Kaechele, 3 miles southeast of Orange Hill, in V. Flores Survey, Austin County. The 1 Kaechele had initial production of 105 bbl. of distillate, along with 8,750,000 cu. ft. of gas, through perforations at 9,052-67 ft.

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Alief	2	1	54	0	1
Alta Loma	2	1	511	0	1
Anahuac	3	2	545	0	1
Arriola	1	0	0	0	1
Bailey's Prairie	2	1	19	0	1
Bammel	1	0	0	1	0
Barbers Hill	3	3	203	0	0
Big Hill	3	0	0	0	3
Blue Ridge	5	3	302	0	2
Boling	4	4	1,349	0	0
Boyle	1	0	0	0	1
Buckeye	1	1	146	0	0
Buck Snag	1	1	114	0	0
Camp Eleven	3	2	1,187	0	1
Caplen	1	1	45	0	0
Chenango	1	1	15	0	0
Chocolate Bayou	3	2	351	0	1
Cistern	1	0	0	1	0
Citrus Grove	2	0	0	2	0
Clinton	1	0	0	0	1
Clodine	7	6	733	0	1
College Point	3	0	0	3	0
Conroe	5	1	156	0	4
Danbury	6	3	375	0	3
Dickinson	3	1	63	2	0
Dyersdale	8	6	1,693	1	1
Edna	2	1	192	1	0
Esperson	12	8	3,185	2	2
Fairbanks	1	0	0	1	0
Fannett	3	1	202	0	2
Fig Ridge	18	18	9,905	0	0
Fostoria	2	1	100	0	1
Francitas	4	4	386	0	0
Fred	1	1	181	0	0
Ganado	18	17	2,481	0	1
Garwood	2	0	0	0	2
Goodrich	6	1	46	0	5
Hampton	2	1	237	0	1
Harmon	10	9	1,077	0	1
Hillje	1	1	42	0	0
Hull	5	4	1,268	0	1
Katy	7	0	0	7	0
La Belle	1	0	0	0	1
Lake Creek	9	8	2,074	0	1
Lakeview	1	0	0	1	0
Lissie	1	1	218	0	0
Livingston	3	2	305	1	0
Lolita	15	13	1,588	0	2
Lovells Lake	16	14	1,894	0	2
Luckey	4	2	307	0	2
Manvel	1	0	0	0	1
Markham	4	1	157	0	3
Martha	1	0	0	0	1
Maurbro	32	31	8,766	0	1
Mayo	23	21	1,981	1	1
Mercy	8	7	2,863	0	1
Millican	1	0	0	0	1
Mustang Creek	2	1	115	0	1
Mykawa	1	1	70	0	0
Navidad	2	0	0	1	1
Needville	7	3	433	2	2
Nome	1	0	0	1	0
North Bay City	5	4	1,146	0	1
North La Ward	59	55	9,719	2	2
North Markham	3	3	616	0	0
Ogburn	1	0	0	1	0
Old Ocean	7	7	3,465	0	0
Orange	2	2	77	0	0
Orange Hill	1	1	105	0	0
Oyster	8	7	2,403	0	1
Pierce Junction	1	1	105	0	0
Pledger	1	0	0	1	0
Port Neches	4	2	92	0	2
Provident City	2	2	214	0	0
Ramers Island	1	0	0	0	1
Red Fish Reef	3	2	358	0	1
Rockland	1	1	10	0	0
Rosenberg	2	1	30	0	1
Sabine Pass	2	0	0	0	2
Saratoga	2	0	0	0	2
Seabreeze	2	2	992	0	0
Sealy	1	1	90	0	0
Sheridan	2	2	311	0	0
Sour Lake	4	2	180	0	2
South Aldine	1	1	36	0	0
Spanish Cape	1	0	0	1	0
Spindletop	1	0	0	0	1
Stewart	6	5	1,004	0	1
Stowell	15	15	3,312	0	0
Sugarland	1	0	0	0	1
Texana	5	1	70	1	3
Thompson	1	1	400	0	0
Thornwell	1	1	40	0	0
Tomball	1	1	29	0	0
Van Vleck	1	1	153	0	0
Vienna	1	1	45	0	0
West Beaumont	5	5	726	0	0
West Columbia	4	3	922	0	1
West Ganado	9	7	649	0	2
West Mauritz	8	6	735	1	1
West Ranch	20	18	2,338	1	1
Westwego	1	1	240	0	0
Willow Slough	1	1	119	0	0
Withers-Magnet	68	62	8,408	2	4
Miscellaneous	109	0	0	0	109
Total	674	437	86,173	38	199

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	88	67	4	17	536,311
February	81	54	1	26	521,968
March	77	55	2	20	527,158
April	37	28	4	5	236,050
May	67	54	0	13	441,010
June	59	39	6	14	382,047
July	50	20	2	18	328,916
August	48	26	6	16	334,610
September	51	31	6	14	316,730
October	39	20	3	16	262,329
November	50	23	2	25	332,232
December	27	10	2	15	189,734
Total	674	437	38	199	4,409,095

In Jackson County the Mayo field was opened in January by J. G. Mayo and W. Stewart Boyle 1 A. C. Rodesney, with initial production of 115 bbl. from pay at 5,408-14 ft., total depth

2-CYCLE IS SIMPLEST ENGINE CONSTRUCTION

NO VALVES TO GRIND

Simplicity of design—few moving parts—are tremendous advantages in mechanical equipment. The 2-cycle engine possesses these great advantages over the 4-cycle. It has an uninvolved fuel injection system—no exhaust valves: it represents the extreme of simplicity in operating principle.

Note the simplicity of CLARK Super-2-Cycle operation, diagramed above. Every up-stroke compresses a fuel mixture. Every down-stroke is a power stroke. There is no "waste stroke", to cut power in half and double wear and tear. Scavenging with 28% excess air is instant and thorough.

Other basic advantages in the CLARK 2-Cycle are: 1. Greater Fuel Economy; 2. Less Wear; 3. Smoother Operation; 4. Fewer Man Hours; 5. Lower Oil Consumption; 6. Lower Installation Cost.

Investigate these claims. Our engineers are at your call.

CLARK BROS. CO., INC. . . . . OLEAN, NEW YORK, U.S.A.

Export Office: 30 Rockefeller Plaza, New York. Domestic Sales Offices and Warehouses: Tulsa, Okla.; Houston, Tex.; Chicago, Ill. (122 S. Michigan Ave.); Boston, Mass. (131 Clarendon St.); Huntington Park, Calif. (5715 Bicket St.) Foreign Offices: 72 Tavistock St., E.C.1., London; Avda Roque Saenz Pena 832, Buenos Aires.

AFFILIATED COMPANIES: Dresser Mfg. Co., Bradford, Pa.; Pacific Pump Works, Huntington Park, Calif.; Bryant Heater Company, Cleveland, Ohio.

CLARK
Super-2-Cycle

7,808 ft. Lively drilling operations followed completion of the discovery, a total of 23 wells in the new pool having been recorded at the end of December. Twenty-one of these were producers, one a gas well, there being only one dry hole.

The Harmon field, nearby in Jackson County, was opened in May by Gulfboard Oil Corp. 1 J. E. Harmon, in the Morris & Cummins Survey, with initial yield of 104 bbl. from pay at 5,356-74 ft. Nine more wells followed the Gulfboard discovery, and all but one of them were producers.

PRODUCTION AND RESERVES—TEXAS GULF COAST

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Raccoon Bend	1,580	26,422	18,578	160
Austin County:				
Brazoria County:				
Angleton	76	557	8,243	2
Chocolate Bayou	132	296	1,204	2
Damon Mound	77	7,195	755	27
Danbury	187	735	1,965	16
Hastings	10,555	45,828	329,172	687
Lochridge	656	3,880	6,370	41
Manvel	1,916	23,180	16,820	174
Old Ocean	3,550	18,216	28,274	109
Rowan	107	298	902	7
West Columbia	1,889	84,393	20,607	148
Miscellaneous	52	568	261	1
Total	19,197	185,146	414,573	1,214
Chambers County:				
Anahuac	3,740	23,846	266,154	359
Barbers Hill	2,990	75,727	29,273	141
Cedar Point	203	1,270	2,230	16
Cotton Lake and South	668	3,655	7,345	50
Fig Ridge	224	276	2,224	24
Oyster Bayou	134	176	2,124	12
Red Fish Reef	258	298	3,102	15
Seabreeze	112	568	10,412	12
Turtle Bay	508	2,480	5,520	38
Willow Slough	71	520	2,480	9
Miscellaneous	50	1,094	576	11
Total	8,956	109,910	331,440	687
Colorado County:				
Miscellaneous	88	218	832	6
Fort Bend County:				
Big Creek	103	10,063	937	17
Blue Ridge	305	11,364	4,636	45
Clodine	183	219	1,781	13
Needville	460	460	5,340	3
Sugarland	627	31,356	58,644	51
Thompson	5,405	48,813	176,187	345
Miscellaneous	43	6,036	604	9
Total	7,126	108,311	248,129	483
Galveston County:				
Alta Loma	79	523	977	6
Caplen	192	512	2,288	15
Dickinson-Gillock	1,821	15,287	29,713	168
High Island	890	18,721	7,279	56
Hitchcock	146	1,019	981	11
League City	535	1,157	8,243	31
Miscellaneous	17	105	95	1
Total	3,680	37,324	49,576	288
Jackson County:				
Cordele	334	2,372	4,428	44
Ganado	298	487	3,113	36
Ganado, West	333	413	17,087	32
Harmon	100	100	3,500	9
Lolita	2,304	3,944	70,056	175
Maurbro	522	705	16,795	61
Mauritz and West	98	605	1,495	12
Mayo	101	101	5,899	18
North La Ward	537	537	24,463	72
West Ranch	5,303	11,330	228,670	377
Miscellaneous	92	380	3,100	50
Total	10,022	20,974	378,606	886
Harris County:				
Clear Lake	641	1,771	32,229	41
Dyersdale	441	802	4,198	47
Eureka	473	3,366	7,134	22
Fairbanks	2,719	11,499	28,501	291
Goose Creek	482	72,851	4,149	83
Humble	827	127,587	7,413	231
Mykawa	212	4,650	1,975	29
Pierce Junction	550	34,570	7,780	65
Satsuma	84	673	927	9
South Houston	666	7,435	6,565	90
Tomball	3,174	23,190	31,810	459
Webster	3,633	12,629	337,371	209
Miscellaneous	183	1,270	1,311	15
Total	14,085	302,293	471,363	1,591
Hardin County:				
Ariola	103	2,325	1,075	12
Batson	248	41,425	3,075	162
Saratoga	259	30,019	2,481	218
Silsbee and West	713	3,411	2,732	54
Sour Lake	306	82,716	2,324	151
Total	1,629	159,896	11,687	597
Jefferson County:				
Amelia	1,437	7,159	14,841	107
Clam Lake	114	425	1,075	12
Fannett	431	3,479	4,021	36
La Belle	73	568	732	6
Lovells Lake	1,791	4,299	53,701	93
Nome	445	2,842	5,158	37
South China	117	416	1,084	15
Spindletop	409	126,301	3,699	123
Stowell	213	266	3,739	11
West Beaumont	727	4,657	7,343	59
Miscellaneous	.....	25	89	1
Total	5,807	150,437	95,477	500
Liberty County:				
Cleveland	87	1,416	1,159	8
Esperson and South	874	8,289	9,211	95
Hankamer	199	6,421	1,804	36
Hardin	1,071	8,550	9,950	145
Hull	1,144	94,053	10,947	178
Martha	192	359	2,041	12
South Liberty	115	15,412	1,088	38
Miscellaneous	2	2,350	4	3
Total	2,684	136,850	36,204	515
Matagorda County:				
Markham	321	8,709	4,091	40
North Markham	202	478	1,722	22
Hamman	534	3,635	4,890	23
Bay City and North	637	5,297	17,703	56
Miscellaneous	102	1,525	1,161	11
Total	1,796	19,644	29,567	152
Montgomery County:				
Conroe	13,589	142,742	557,268	932
Miscellaneous	47	92	3,558	4
Total	13,636	142,834	560,826	926
Orange County:				
Orange and West	665	35,044	5,956	79
Port Neches and West	361	6,352	3,648	43
Total	1,026	41,396	9,604	122
Polk County:				
Livingston	511	7,288	8,712	77
Segno	1,320	6,587	15,413	118
Miscellaneous	96	505	995	7
Total	1,927	14,380	25,120	202
San Jacinto County:				
Mercy	150	159	3,441	9
Miscellaneous	1	2	.....	0
Total	160	161	3,441	9
Tyler County:				
Camp Eleven	78	78	722	2
Joe's Lake	740	3,223	14,777	42
Miscellaneous	33	38	562	2
Total	851	3,339	16,061	46
Washington County:				
Clay Creek	146	4,692	1,308	50
Miscellaneous	2	384	6	6
Total	148	5,076	1,314	56
Wharton County:				
Boling	337	7,864	3,061	55
Hillje	199	507	2,293	15
Louise	432	3,854	4,146	36
Pickett Ridge-Kubela	666	5,803	7,197	61
Withers-Magnet	4,239	14,056	40,944	387
Miscellaneous	7	47	54	1
Total	5,800	32,131	57,695	555
Total Texas Gulf Coast	101,100	1,496,842	2,760,093	8,995

Kansas Wildcat Completions Increase 64 Per Cent Over 1941

by Carl Hoot

EXPLORATION work in Kansas took a decided upturn about the middle of the year and was hitting a fast pace as the year ended. There were 351 wildcat wells completed in 1942 compared with 214 for 1941, an increase of 64 per cent. Of this total, 37 were oil wells and 3 gas wells. The number of field completions was 1,519 in 1942, a drop only 28 per cent over the previous year. This decline is small when compared with other oil-producing states.

An increased outlet for Kansas' crude has furnished the main incentive in the search for oil. Until production from Oklahoma and Illinois declined, Kansas operators were held back for lack of a market. Also, in many instances, inadequate pipe-line capacity retarded development of proven areas. A change in this picture was noted during the last quarter of 1942 when the state's allowable was raised to above 300,000 bbl. daily for the first time. Production soared rapidly from an average of 265,000 bbl. a day to over 310,000 bbl., which was an all-time high.

The outstanding development in Kansas during 1942 was the Peace Creek Viola lime pool of Reno County. Although discovered in July 1941, the most intensive drilling occurred during the first half of 1942. Beginning about 4 miles northeast of the Zenith pool, the field had a rapid growth. Peace Creek and Zenith produce from similar stratigraphic traps.

Production has shown a steady climb at Peace Creek and at the end of the year more than 100 wells were producing in excess of 280,000 bbl. a month. Drilling settled to a routine the latter part of the year, with an average of three or four new wells completed each week. The south tip and southeastern side appear to be the only sections defined by dry holes. Good wells are still being brought in at the northeast tip and the pool is now nearly 9 miles in length.

Important developments took place along the Barton arch, or Central Kansas uplift. Here a number of wildcats produced oil but in most cases they were located near existing pools and served mainly as connect-

(Continued on Page 153)

PRODUCTION AND RESERVES—KANSAS

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Barber County:				
Whelan	201	7,954	2,806	18
Miscellaneous	62	163	867	4
Total	263	8,117	3,673	22
Barton County:				
Ainsworth, N and W	585	2,569	8,471	66
Beaver-Feltes	515	2,031	5,029	50
Beaver and North	*247*	*1,541*	*2,619*	*37*
Feltes	*268*	*490*	*2,410*	*13*
Bloomer	2,748	12,840	23,260	151
Bloomer	*2,465*	*11,297*	*19,930*	*122*
Breford	*283*	*1,543*	*3,330*	*29*
Kraft-Prusa	2,965	5,801	27,649	252
Silica-Raymond	9,063	52,561	86,719	864
Silica	*8,079*	*44,860*	*76,300*	*774*
Raymond	*774*	*7,090*	*7,410*	*67*
Wenke and West	*116*	*486*	*1,014*	*11*
Hagan	*43*	*74*	*406*	*4*
Marchand	*51*	*51*	*589*	*8*
Rick	90	345	935	9
Lanternman	115	428	1,012	11
Miscellaneous	233	964	1,468	30
Total	16,314	122,399	153,541	1,433
Clark County:				
Morrison	9	131	69	1
Ellis County:				
Bemis-Walters	5,847	23,651	48,449	498
Bemis-Shutts	*4,978*	*20,553*	*41,847*	*426*
Koblitz	*83*	*217*	*583*	*8*
Marshall	*261*	*955*	*1,945*	*24*
Walters	*525*	*1,926*	*4,074*	*40*
Blue Hill	171	171	1,429	19
Burnett and South	4,097	9,767	26,233	203
Miscellaneous	275	1,664	2,636	43
Total	10,390	35,253	78,747	769
Ellsworth County:				
Stoltenberg-Wilkens	2,711	11,085	23,915	236
Stoltenberg	*1,881*	*8,476*	*15,984*	*168*
Wilkens	*815*	*2,281*	*7,819*	*66*
Heiken	*15*	*328*	*112*	*2*
Lorraine	450	8,743	4,057	83
Total	3,161	19,828	27,972	319
Finney County:				
Nunn	32	47	313	2
Graham County:				
Morel	296	410	3,270	15
Miscellaneous	26	28	292	2
Total	322	438	3,562	17
Harvey County:				
Halstead	97	1,393	907	11
Hollow-Nikkel	346	19,131	2,869	56
Sperling	51	394	506	7
Total	494	20,918	5,372	74
Kearny County:				
Patterson	32	40	440	3
Kingman County:				
Cunningham	728	3,439	9,161	84
McPherson County:				
Bornholdt-Welch	1,857	7,813	17,287	177
Bornholdt and West	*822*	*3,426*	*16,474*	*148*
Welch and East	*45*	*4,387*	*813*	*29*
Chindberg	73	1,494	516	29
Graber-Hesston	950	6,954	8,646	125
Henne	137	164	2,436	13
Johnson	92	2,719	911	14
Lindsborg	282	269	4,231	45
Ritz-Canton	1,145	38,056	9,144	241
Roxbury and South	419	831	4,369	39
Voshell	535	24,068	4,832	88
Miscellaneous	83	1,076	724	32
Total	5,493	81,544	53,096	803
Ness County:				
Aldrich	155	512	2,088	12
Norton County:				
Hewitt	9	13	387	2

(Continued on Next Page)

PRODUCTION AND RESERVES—KANSAS

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Pawnee County:				
Pawnee Rock, East	328	640	4,160	26
Zook	7	7	313	2
Total	335	647	4,473	28
Phillips County:				
Dayton	130	137	3,063	23
Ray, Southeast	731	924	6,276	64
Miscellaneous	3	21	299	2
Total	864	1,082	9,638	89
Pratt County:				
Cairo	24	65	235	2
Iuka	100	234	1,066	13
Total	124	299	1,301	15
Rush County:				
Otis-Albert	495	2,722	5,278	36
Albert	*228*	*880*	*1,540*	*17*
Otis	*267*	*1,862*	*3,538*	*19*
Total	495	2,722	5,278	36
Reno County:				
Burrton	2,101	35,200	11,600	198
Peace Creek	1,650	1,724	14,276	128
Hilger	330	2,368	3,632	32
Lerado	141	2,486	2,014	34
Miscellaneous	84	859	941	18
Total	4,306	42,637	32,463	410
Rice County:				
Chase-Campbell	3,379	25,770	28,730	388
Geneseo-Edwards	3,716	13,700	31,100	282
Geneseo	*2,702*	*9,726*	*22,274*	*193*
Edwards	*1,014*	*3,974*	*8,826*	*89*
Hafferman	74	575	625	8
Orth and East	120	891	1,109	14
Ploog	74	1,315	685	9
Smyres	128	128	2,012	22
Wherry and East	695	8,448	5,232	181
Miscellaneous	164	1,128	1,472	26
Total	8,350	51,955	70,965	930
Rooks County:				
Laton	629	1,707	7,303	81
Westhusin	129	524	1,476	14
Miscellaneous	99	387	813	18
Total	857	2,618	9,592	113
Russell County:				
Atherton-Russell	628	6,632	6,288	83
Atherton and North	*184*	*1,280*	*1,470*	*32*
Russell and North	*444*	*5,352*	*4,810*	*51*
Big Creek-Vaughn	1,004	4,972	10,028	106
Big Creek and S and E	*676*	*3,674*	*6,526*	*77*
Vaughn	*328*	*1,298*	*3,502*	*29*
Fairport and North	596	15,812	5,288	146
Gorham	2,734	22,143	29,657	294
Greenvale and N and W	532	900	5,530	53
Hall-Gurney	4,057	13,482	44,518	435
Trapp-Sellens	9,726	38,005	79,295	907
Miscellaneous	264	746	1,854	52
Total	19,541	102,692	182,448	2,076
Scott County:				
Shallow Water	115	1,161	1,039	9
Sedgwick County:				
Eastboro	154	8,025	1,235	35
Goodrich	287	3,198	3,402	33
Greenwich	219	6,709	2,321	42
Robbins	80	3,091	669	29
Valley Center	271	20,493	2,807	50
Total	1,011	41,516	10,434	189
Stafford County:				
Bedford	293	475	2,825	22
Drach-Fisher-Gates	259	1,361	2,139	30
Drach	*109*	*415*	*981*	*16*
Fisher	*28*	*138*	*102*	*3*
Gates	*122*	*808*	*1,056*	*11*
Jordan	102	358	1,042	7
Kipp	80	226	774	8
Leesburgh	289	576	2,924	13
Richardson	651	5,054	6,946	60
St. John	306	1,261	1,839	24
Sittner-Max	451	1,093	5,107	36
Sittner, South	*249*	*610*	*3,490*	*24*
Max-Mueller	*202*	*483*	*1,717*	*12*
Snider, South	115	236	964	10
Stafford	383	589	3,811	22
Zenith	3,593	10,335	32,365	308
Miscellaneous	129	241	1,159	14
Total	6,651	21,805	61,895	554
Sumner County:				
Caldwell	73	1,473	657	4
Churchill	141	18,603	1,267	53
Latta	89	241	959	15
Oxford, West	206	15,108	1,872	60
Wellington	248	5,065	1,245	80
Miscellaneous	142	2,418	1,272	29
Total	901	42,908	7,272	241
Trego County:				
Miscellaneous	44	490	410	21
Total western Kansas	80,996	605,211	735,719	8,252
EASTERN KANSAS				
Butler County:				
Augusta, South	507	47,757	5,103	240
Brandt	175	811	1,939	43
Elbing	286	706	2,664	59
El Dorado	2,498	182,397	28,903	1,746
Fox Bush	122	242	1,308	156
Keighley-Blankenship	221	355	1,895	147
Haverhill-Kramer	443	4,087	5,403	190
Garden-Shaffer-Reynolds	*153*	*303*	....	*59*
Haverhill	*132*	*3,460*	....	*67*
Kramer-Stern	*129*	*284*	....	*35*
Leon-Weaver	*29*	*60*	....	*29*
Potwin	231	483	2,657	96
Miscellaneous	217	1,199	1,801	112
Total	4,700	238,037	51,673	2,789
Coffey County:				
Miscellaneous	20	38	162	28
Cowley County:				
Couch	168	286	1,684	20
David-Sherwood	100	786	824	59
Frog Hollow and East	390	1,093	3,207	49
Hittle	803	4,002	8,498	69
Rainbow-Gueda	326	13,785	2,815	65
Rock and North	166	2,159	2,251	33
Weathered	143	2,200	1,780	85
Winfield-State	237	322	2,838	110
Miscellaneous	697	6,040	6,420	100
Total	3,040	30,673	30,217	590
Elk County:				
Miscellaneous	312	737	2,952	341
Greenwood County:				
Atyco-Teeter-Pixley	722	59,998	8,040	307
Beaumont, South	345	....	4,120	23
Lamont	120	In Virgil	1,320	44
Quincy	159	In Virgil	1,750	101
Sallyards	346	28,225	4,125	159
Seely-Wick	860	36,527	9,930	578
De Malorie-Sowder	*316*	....	....	*129*
Hamilton	*68*	....	....	*37*
Madison	*154*	....	....	*100*
Seely-Wick	*325*	....	....	*312*
Virgil-Dunaway	549	32,661	6,040	498
Winterscheid	180	In Virgil	1,980	186
Miscellaneous	320	12,440	3,520	226
Total	3,601	169,851	39,825	2,122
Jefferson County:				
McLouth	92	92	908	13
Marion County:				
Lost Springs	819	1,659	7,941	117
Miscellaneous	167	2,046	1,604	31
Total	986	3,705	8,545	148
Eastern counties:				
Neosho Falls	518	....	....	50
Miscellaneous	2,614	....	....	6,218
Total	3,132	125,757	36,818	6,268
Total eastern Kansas	15,683	568,880	161,100	12,299
Total Kansas	96,879	1,174,101	896,819	20,551
NEBRASKA				
Barada	393	713	887	....
Falls City	902	2,556	1,443	....
Miscellaneous	58	75	225	....
Total	1,353	3,344	2,555	92

SOUTHWEST TEXAS

Subnormal Exploration Yields Few Discoveries

by T. F. Smiley

BOTH the low percentage of producing wells resulting from wildcat operations in the Southwest Texas territory during 1942 and the relatively unimportant character of strikes recorded indicate that geophysical exploration will play a larger part in oil developments in the future. Of 319 wildcat ventures 293 ended in disappointment. There were 23 oil wells and 3 gas wells to show for the time and money expended on drilling campaigns. As a matter of fact, geophysical crews were active in various areas, and it was said that more would be in the field but for the inroads made by the war on manpower.

The South Caesar field, in the northern part of Bee County, affords an exception to any general statement tending to classify all the new pools of 1942 as of indifferent quality. The South Caesar, opened in February by Tom Slick, Jr., 1 J. J. Grissom a mile south of the Caesar field, yielded the first production from the Carrizo sand. Initial output was 127 bbl. from pay at 6,552-57 ft. This was followed by an extension and new sand discovery at 6,611-55 ft. Each of these sands is more than 50 ft. thick. Active development of the field followed the discovery, and a total of 19 wells had been drilled at the close of the year. Twelve of these were producers, and seven were dry.

The effects of low crude prices and of priorities and drilling restrictions resulting from the war were plainly visible in the sharp drop in field operations as compared with those of 1941. In 1941 there was 1,841 well completions in the Southwest Texas district. In 1942 there were 1,026, a decline of 815. The figures cover both field and wildcat operations.

The severest decline was in the 29 counties comprising the south-central area. The 95 completions recorded in 1942 compare with 248 in the preceding year. The area suffered most heavily too in the proportion of failures to the total number drilled. There were 74 of these. Approximately one out of every three holes drilled in lower Gulf area was dry the figures being 167 failures out of 503 completions. The South Texas area did a little better, there being 236 dry holes out of 428 completions.

The new Sarco gas field in Goliad County was opened by Ginther, Warren & Ginther 1 C. G. and R. H. Wood in the D. Morris Survey, 9 miles southeast of Goliad. The well produced 180,000,000 cu. ft. of gas on open flow, along with 50 bbl. of distillate.

De Witt County contributed two discovery wells, but neither of them started a drilling campaign. One of them Tide Water-Seaboard and Adams

PRODUCTION AND RESERVES—LOWER GULF COAST

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Aransas County:				
McCampbell	625	11,551	14,449	202
Miscellaneous	8	8	32	1
Total	633	11,559	14,481	203
Bee County:				
Caesar and South	112	1,116	2,266	25
Dirks	143	6,098	3,002	86
Pettus	147	9,567	1,533	78
Miscellaneous	75	8,007	506	56
Total	477	84,788	7,307	235
Calhoun County:				
Heyser	2,934	17,246	26,674	235
Miscellaneous	64	683	701	6
Total	2,998	17,929	27,375	241
Goliad County:				
Miscellaneous	14	176	100	4
Karnes County:				
South Burnell	11	981	119	25
Kleberg County:				
Miscellaneous	17	792	158	3
Jim Wells County:				
Alfred and West	105	370	1,750	22
Alice and East	568	4,322	12,078	80
Ben Bolt	450	2,041	5,909	66
Orange Grove	533	1,111	5,189	36
Reynolds	220	1,180	2,450	26
Seeligson	252	709	49,291	86
Wade City	615	2,417	9,583	95
Miscellaneous	206	2,594	7,055	40
Total	2,949	14,744	93,305	451
Live Oak County:				
Oakville	261	829	3,171	32
White Creek and South	147	388	3,312	35
Miscellaneous	21	706	141	7
Total	429	1,923	6,624	74
Nueces County:				
Agua Dulce-Stratton	1,258	5,850	21,150	221
Clara Driscoll and South	710	4,571	7,649	135
Corpus Christi	105	6,704	1,296	11
Flour Bluff and East	426	7,716	18,284	110
Luby and North	816	7,368	19,632	149
Minnie Bock	731	1,939	12,061	67
Richard King	641	2,445	6,955	73
Saxet	2,443	42,464	27,036	357
Shield	102	233	1,287	10
Turkey Creek	557	4,221	5,773	56
Miscellaneous	141	1,277	1,553	20
Total	7,910	84,788	122,676	1,209
Refugio County:				
Greta	1,150	28,065	20,065	200
La Rosa	377	3,721	16,279	84
Mellon Creek	150	553	1,822	10
Refugio-Fox-Mission River	1,478	48,642	15,358	183
Tom O'Connor	6,770	33,696	366,304	448
Miscellaneous	100	864	3,557	15
Total	10,025	115,561	423,385	940
San Patricio County:				
Midway	871	2,418	10,082	56
Odem	364	408	4,792	39
Plymouth	2,758	25,729	38,271	185
Taft	335	5,341	12,659	69
White Point and East	2,886	11,374	36,626	236
Miscellaneous	0	112	0	0
Total	7,214	45,382	102,430	585
Victoria County:				
Coletto Creek	167	1,514	2,686	31
Cologne	75	113	887	8
Keeran	101	1,372	2,228	23
McFaddin and North	848	3,579	12,621	91
Placedo and East	1,225	14,370	17,630	183
Victoria	102	271	1,554	15
Miscellaneous	8	102	83	3
Total	2,526	21,321	37,689	354
Willacy County:				
Miscellaneous	34	93	3,923	7
Total lower Gulf Coast	35,237	400,037	839,572	4,331

FOR STANDARD HIGH HEAD SERVICE. Types T and XT. Capacities: Up to 150 G.P.M. or 200 lbs. differential pressure.

FOR HIGH TEMPERATURES up to 850° F. Types PT and PXT. Cradle mounting, stuffing box, and ball bearings all water cooled. Capacities: Up to 150 G.P.M. or 175 lbs. differential pressure.

Check YOUR PUMP REQUIREMENTS AGAINST

DAYTON-DOWD

TURBINE PUMP FEATURES

☐ **HIGH PRESSURES IN SINGLE STAGE**
Regenerative principle of this pump enables its single, multi-vaned impeller, operating at normal speeds, to develop very high pressure in single stage.

☐ **LOW NPSH REQUIREMENT**
Lower pressure drop (suction loss) is an outstanding turbine pump characteristic. This characteristic assures satisfactory operation under minimum head conditions.

☐ **ONE LOW-PRESSURE STUFFING BOX**
Subjected to suction pressure *only*—never to discharge pressure. Minimizes chance for leakage. Ideal for volatile liquids.

☐ **SELF-PRIMING . . . HANDLES VAPOR WITH LIQUID**
Pump keeps its prime after initial start. Gradual increase in pressure from inlet to discharge minimizes possibility of vapor-locking.

☐ **CRITICAL METALS MINIMIZED**
Only a small casing, two sideplates and the impeller comprise the pump-end. Saves on critical metals. Lowers cost of corrosion-resisting construction.

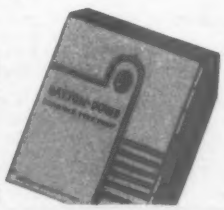
☐ **ONLY 1 ROTATING PART . . NO FRICTIONAL CONTACT**
Single impeller rotates freely without wear from metal-to-metal contact.

☐ **PERFECT HYDRAULIC BALANCE**
Liquid is delivered *equally* to *both* sides of impeller through twin inlet openings. Eliminates thrust on ball bearings.

☐ **LOWER COST STAND-BY PROTECTION**
Wearing surfaces are all incorporated in side-plates and impeller. Extra set affords stand-by protection at nominal cost.

Free **Turbine Pump Data Book** Contains 144 pages of illustrations, performance curves, selection tables, installation and operating information, and miscellaneous data on turbine pumps. *Write for your FREE copy today!*

DAYTON-DOWD COMPANY
QUINCY, ILLINOIS
Offices in Principal Cities
TURBINE AND CENTRIFUGAL PUMPS

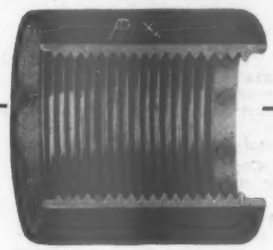


CURTIN CENTRIFUGES

GIVE YOU QUICK, ACCURATE RESULTS WITH LESS EFFORT . . . AT LESS COST

Simple in design, ruggedly built for heavy duty service. Gear ratio and throw of crank produce required speed with no strain. Heads and cranks of 100 CC and 15 CC machines are interchangeable. Meets *A.S.T.M. Standard Method D-96* and *A.P.I. Code No. 25* requirements. Ask for full details.

W·H·CURTIN & CO. Inc.
HOUSTON U.S.A. TEXAS



A. P. I. "X-L"
RECESSED
LINE PIPE
COUPLINGS

Our special patented process of recessing "X-L" Couplings assures perfect alignment, tighter joints and protection of vanishing threads—giving longer life to the line. Made in strict accordance with A.P.I. standards in all sizes. Microscopically tested to insure maximum accuracy.

Warehoused by:
HENRY H. PARIS
1121 Rothwell St., Houston
JAMES RIORDAN CO.
Los Angeles, San Francisco

WHEELING MACHINE PRODUCTS COMPANY
WHEELING, WEST VIRGINIA

Oil & Gas Co. 1 F. G. Gips, in the W. A. Moore Survey, opened the Nordheim field. The other, Adams Oil & Gas Co. 1 H. Berck, 3 miles east of Yorktown, opened the Yorktown field.

Union Producing Co. opened a gas field in Victoria County in November with its 1 Pete Rydolph, in the J. F. Kemper Survey. The well's initial production was 162,000,000 cu. ft. of gas through open tubing.

Watched with interest as the year closed was Sun Oil Co. 1 D. Laurel, 2 miles west of the North Sun field, in Starr County, and 1½ miles from production. This wildcat, one of the deepest active operations in the Rio Grande Valley, was at 8,542 ft., making distillate and gas on a drill-stem test.

LOWER GULF COAST

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Agua Dulce	48	38	4,977	4	6
Alice	1	1	106	0	0
Armagosa	1	0	0	1	0
Ben Bolt	18	7	1,405	5	6
Chapman	1	1	25	0	0
Clara Driscoll	4	3	162	0	1
Cologne	2	2	122	0	0
East Flour Bluff	1	1	110	0	0
East Placedo	11	11	1,293	0	0
Fagan	5	4	284	1	0
Flour Bluff	1	1	10	0	0
Greta	7	6	459	0	1
Holzmark	1	1	5	0	0
Kingsville	2	1	50	0	1
Koopman	2	1	50	0	1
La Gloria	5	4	678	0	1
McAllen	1	1	320	0	0
McFaddin	6	3	396	0	3
Medio Creek	1	1	6	0	0
Midway	16	12	1,689	0	4
Minnie Bock	7	6	224	0	1
Nordheim	1	1	36	0	0
North McFaddin	1	0	0	1	0
North Pettus	2	2	88	0	0
Odem	39	32	3,465	2	5
Orange Grove	8	5	445	2	1
Pentas	1	1	22	0	0
Petronilla	5	3	485	0	2
Plymouth	3	3	341	0	0
Quinto Creek	4	2	174	1	1
Refugio	8	5	576	0	3
Richard King	8	7	527	0	1
Rooke	3	3	465	0	0
St. Charles	2	1	63	0	1
Sarco	1	1	50	0	0
Saxet	1	0	0	1	0
Seeligson	63	61	7,613	1	1
Shield	1	1	165	0	0
South Caesar	19	12	4,056	0	7
Southeast Grove	1	1	10	0	0
Stratton	65	55	7,214	7	3
Tynan	1	1	49	0	0
Victoria	2	1	48	1	0
Von Blucher	2	1	40	1	0
Wade City	2	1	192	0	1
Willamar	1	1	121	0	0
West Tuleta	2	1	260	0	1
Yorktown	1	1	6	0	0
Miscellaneous	115	0	0	0	115
Total	503	308	38,877	28	167

SOUTH TEXAS

Summary of Wells Completed During 1942

Aviator	4	0	0	0	4
Blas Uribe	1	0	0	0	1
Boyle	5	2	143	0	3
Cadena (NE Tesoro)	1	1	68	0	0
Casa Blanca	7	6	288	0	1
Colorado	48	41	4,772	1	6
Driscoll	13	11	2,073	0	2
East	1	1	12	0	0
East Cole	4	3	51	0	1
Frost	1	1	32	0	0
Garcia	6	4	577	0	2
Glenn	3	1	400	0	2

PRODUCTION AND RESERVES—SOUTH AND SOUTH CENTRAL TEXAS

(In thousands of barrels)

SOUTH TEXAS

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Brooks County:				
Alta Mesa	181	1,222	3,038	33
Miscellaneous	0	30	0	0
Total	181	1,252	3,038	33
Duval County:				
Benavides and East	755	11,181	11,819	124
Casa Blanca and W & N	175	691	3,907	74
Cedro Hill	195	735	1,915	77
Charamousca and South	117	762	1,438	34
Driscoll	930	4,887	11,113	61
Eagle Hill	221	1,798	2,202	50
Fitzsimmons	180	2,597	2,603	78
Government Wells	2,112	49,765	18,360	640
Hoffman	1,387	8,883	11,117	337
Loma Novia	1,641	26,646	15,354	556
Longhorn	322	1,861	2,639	42
Lundell	331	1,482	2,716	94
Piedre Lumbre	554	3,244	5,006	130
Sarnosa	117	2,660	1,340	37
Seven Sisters and South	2,025	17,841	20,159	405
Tarancahuas	109	411	1,189	29
Miscellaneous	376	3,717	3,677	159
Total	11,547	139,161	116,554	2,927
Hidalgo County:				
Nichols	118	176	1,224	14
Sam Fordyce and North	212	8,088	3,912	53
Sullivan City	168	506	1,894	33
Miscellaneous	0	176	0	0
Total	498	8,946	7,030	100
Jim Hogg County:				
Colorado	407	2,322	7,278	227
Kelsey	260	2,007	27,993	110
Miscellaneous	204	8,487	1,823	122
Total	871	12,816	37,094	459
La Salle County:				
Washburn	79	105	895	10
McMullen County:				
Ezzell	232	2,698	2,702	127
Jacobs	81	1,668	732	71
Miscellaneous	134	1,352	1,528	84
Total	347	5,718	4,962	282
Starr County:				
Boyle	73	173	1,727	12
Guerra	75	1,281	719	12
Sun and North	361	1,294	12,706	90
Rincon and North	1,821	3,864	20,136	154
Miscellaneous	195	1,903	4,955	136
Total	2,525	8,515	40,243	404
Webb County:				
Adami	97	470	930	64
Aviator	89	6,178	822	73
Bruni-Cole-O'Hern	974	18,221	11,779	278
Glen	349	902	5,498	70
Killam and North	231	1,196	2,407	92
Lopez	969	12,359	9,641	312
Mirando City	96	9,321	879	63
Oilton	98	1,709	991	7
Volpe	124	476	1,824	28
Miscellaneous	146	4,734	1,152	27
Total	3,143	55,566	35,923	1,014
Zapata County:				
Comitas	826	9,630	1,170	143
Escobas-Jennings	429	2,409	2,391	334
Mirando Valley	106	1,456	1,144	68
Miscellaneous	25	2,839	214	53
Total	688	16,334	4,919	598
Total South Texas	19,879	248,413	250,658	5,827

SOUTH CENTRAL TEXAS

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Bastrop County:				
Hilbig	71	1,689	511	12
Miscellaneous	45	1,494	417	18
Total	116	3,183	928	30
Bexar County:				
Somerset	146	11,551	1,409	685
Miscellaneous	92	2,074	684	391
Total	238	13,625	2,093	1,076
Caldwell County:				
Bee Creek	88	243	857	30
Luling-Branyon	1,896	78,783	18,277	715
Lytton Springs	93	8,548	752	145
Salt Flat and North	1,022	43,772	11,328	269
Tenney Creek	113	203	1,797	24
Miscellaneous	104	3,309	961	84
Total	3,316	134,858	33,972	1,267
Frio County:				
Pearsall	181	1,701	3,699	35
Guadalupe County:				
Darst Creek	1,262	53,624	11,186	336
Miscellaneous	31	571	261	45
Total	1,293	54,195	11,447	381
Milam County:				
Minerva-Rockdale	68	3,827	573	408
Miscellaneous counties	119	7,881	1,043	246
Total	5,331	219,260	53,755	3,443

Field—	Comp.	Oil	Prod.	Gas	Dry
Government Wells	4	2	400	0	2
Greer Branch	4	0	0	0	4
Hoffman	9	7	473	0	2
Killam	1	0	0	1	0
Kohler	2	0	0	1	1
Kreis	9	2	90	0	7
La Reforma	2	0	0	0	2
Las Animas	2	2	40	0	0
Lopeno	1	0	0	1	0
McAllen	1	1	32	0	0
McLean	7	4	263	0	3
Neuhas	2	1	75	0	1
Nichols	3	2	108	0	1
North Moca	1	1	15	0	0
North Rincon	2	1	159	1	0
North Sun	11	6	810	0	5
Oakville	9	8	351	0	1
Peters	2	0	0	1	1
Piedre de Lumbra	3	1	12	0	2
Pentas	1	1	22	0	0
Rancho Solo	1	1	70	0	0
Rincon	32	26	4,517	1	5
Sejita	6	1	590	2	3
Seven Sisters	6	4	149	0	2
South Campana	11	10	714	1	0
South Rincon	1	1	32	0	0
S. Seven Sisters	2	2	61	0	0
South Washburn	1	1	422	0	0
S. White Creek	5	2	203	0	3
Sun	16	12	1,082	0	4
Washburn	10	6	1,649	0	4
Yturria	9	6	683	0	3
Miscellaneous	159	0	0	0	159
Total	428	182	21,438	10	236

SOUTH CENTRAL TEXAS

Summary of Wells Completed During 1942

Bee Creek	7	4	128	0	3
Buchanan	1	1	11	0	0
Chicon Lake	7	5	17	1	1
Dale	2	1	99	0	1
Floresville	4	0	0	0	4
Gas Ridge	7	3	6	0	4
Imogene	1	1	38	0	0
Lentz	4	1	4	0	3
Pearsall	1	1	76	0	0
Pendencia Creek	2	0	0	1	1
Poth	1	1	25	0	0
Rockdale	1	1	20	0	0
Miscellaneous	57	0	0	0	57
Total	95	19	420	2	74

LOWER GULF COAST

Summary of Wildcat Completions in 1942

County—	Comp.	Oil	Gas	Dry
Aransas	2	0	0	2
Bee	21	3	0	18
Calhoun	4	0	0	4
Cameron	1	0	0	1
De Witt	2	2	0	0
Goliad	5	1	0	4
Hidalgo	15	1	0	14
Jim Wells	15	4	1	10
Karnes	5	0	0	5
Nueces	15	0	0	15
Refugio	10	1	0	9
San Patricio	12	1	0	11
Victoria	9	0	1	8
Willacy	2	0	0	2
Total	118	13	2	103

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	78	53	5	20	493,372
February	41	30	2	9	302,764
March	62	38	2	22	384,352
April	40	21	3	16	252,198
May	20	14	2	4	133,816
June	60	31	2	27	382,891
July	29	17	2	10	174,663
August	43	31	0	12	262,308
September	23	17	1	5	148,549
October	48	22	2	24	304,274
November	34	20	6	8	208,369
December	25	14	1	10	148,054
Total	503	308	28	167	3,195,610

SOUTH TEXAS

Summary of Wildcats Completed in 1942

County—	Comp.	Oil	Gas	Dry
Brooks	4	0	0	4
Duval	41	2	0	39
Jim Hogg	15	1	0	14
La Salle	8	0	0	8
Live Oak	11	1	0	10
McMullen	9	0	0	9
Starr	35	3	0	32
Webb	19	1	0	18
Zapata	8	0	0	8
Total	150	8	0	142

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	73	36	5	32	255,764
February	42	22	2	18	149,526
March	58	27	0	31	266,205
April	37	14	1	22	126,413
May	7	0	0	7	21,257
June	58	24	0	34	234,239
July	14	3	0	11	66,974
August	27	11	0	16	95,010
September	28	14	1	13	109,266
October	30	16	0	14	98,334
November	33	8	0	25	143,112
December	21	7	1	13	84,393
Total	428	182	10	236	1,650,493

SOUTH CENTRAL TEXAS

Summary of Wildcats Completed in 1942

County—	Comp.	Oil	Gas	Dry
Atascosa	3	1	0	2
Bastrop	8	0	0	8
Bexar	3	0	0	3
Caldwell	4	0	0	4
Dimmitt	2	0	1	1
Edwards	1	0	0	1
Frio	1	0	0	1
Gonzales	4	0	0	4
Guadalupe	1	0	0	1
Lee	3	0	0	3
Milam	5	0	0	5
Travis	1	0	0	1

Under the tremendous weights, strains and impacts of drilling and producing operations, heavy duty equipment will stand the gaff only if the bearings function flawlessly. AMERICAN SUPER HEAVY DUTY Roller Bearings are built with the vital extra capacity to *take it*. They will keep your heaviest rig equipment producing with maximum efficiency. Consult our engineers for full technical facts.

AMERICAN ROLLER BEARING CO.
PITTSBURGH PENNSYLVANIA

Pacific Coast Office: Edward D. Maltby Co., 1718 S. Flower St., Los Angeles, California

AMERICAN
Heavy-Duty ROLLER BEARINGS

County—	Comp.	Oil	Gas	Dry
Val Verde	1	0	0	1
Williamson	9	0	0	9
Wilson	5	1	0	4
Total	51	2	1	48

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	16	5	0	11	20,944
February	11	3	0	8	25,513
March	19	2	0	17	31,677
April	7	2	1	4	13,807
May	5	1	0	4	5,402
June	7	3	0	4	19,290
July	3	0	1	2	11,152
August	3	0	0	3	11,852
September	4	0	0	4	21,754
October	9	1	0	8	23,352
November	8	1	0	7	37,248
December	3	1	0	2	4,971
Total	95	19	2	74	226,962

Kansas Fields

(Continued from Page 147)

ing wells. The Kraft-Prusa area spread out to take in a number of adjoining fields, including the Krier and Felts pools and is approaching the Breford-Bloomer area. The Trapp pool, having taken in Susank and North Ainsworth, was bordering the main Ainsworth field. The Rusch discovery in the center of the area separating the Gorham, Hall-Gurney, and Trapp pools opened a sizable tract for future development in connecting these producing areas. At the indicated rate of expansion and barring further restrictions on drilling, the trend running from Burnett and Bemis-Shutts in Ellis County to the Bloomer - Wilkins and Stoltenberg pools of Barton and Ellsworth counties may eventually merge into one continuous producing area.

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	136	92	9	37	402,332
February	135	82	3	50	332,507
March	66	33	1	32	209,669
April	131	62	4	65	426,407
May	99	50	7	42	299,499
June	126	72	7	47	414,766
July	160	77	10	73	510,613
August	149	88	6	55	485,060
September	165	87	13	65	543,375
October	110	66	4	40	360,411
November	108	46	7	55	353,049
December	132	58	8	68	457,251
Total	1,519	813	79	627	4,794,939

In McPherson County, the two-zone Lindsborg pool had a rapid expansion. The balance of this occurred during the last half of 1942 when Auto-Ordnance Corp. entered the field and gave it its second pay in Simpson sand, the first being in the Viola lime. Early in the year this field was brought to the attention of operators when the 1 Rundberg, then a 1-mile south extension, was completed for nearly 500 bbl. a day in the Viola. A number of offset locations were immediately staked but only four were completed. In the meantime, Simpson pay was found in north and east extensions and activity shifted in this direction.

Prospects of an oil well in Saline County were good as the year ended. This county, which for years has been a graveyard of dry holes, had nine wells drilling during the year. However, the latter part of December Deep Rock Oil Corp. 1 Hunter, NE NW SW 20-16-1w, was reported to be showing oil in Mississippian chat at 2,379-83 ft. This well later produced about 12 bbl. of oil an hour. Location of the well is in the southeastern part of the county and 5 miles directly north of the Roxbury chat pool of McPherson County.

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Ainsworth	16	7	5,596	0	9
Beaumont	13	9	230	0	4
Beaver and N	4	3	692	0	1
Bedford	9	8	11,433	0	1
Bemis-Shutts	26	23	28,433	0	3
Big Creek	4	2	2,249	0	2
Bloomer	8	4	7,439	0	4
Burnett	5	4	3,304	0	1
Chase	38	27	12,718	0	11
Couch	5	3	2,044	0	2
Crowther	4	3	6,831	0	1
Cunningham	19	13	6,047	1	5
Curtis	1	0	0	0	1
Davidson	5	3	1,051	0	2
Dayton	21	18	8,011	0	3
Deichman	2	0	0	0	2
Drach	2	2	500	0	0
Eberhardt	5	2	3,343	1	2
Edwards	3	2	3,204	0	1
Eldorado	19	19	428	0	0
Fairport	5	3	544	0	2
Forest Hills	4	2	534	0	2
Frog Hollow	16	12	5,788	0	4
Geneseo	6	6	12,230	0	0
Gorham	13	11	2,201	0	2
Greenvale	17	16	13,213	0	1
Gustason	4	3	629	0	1
Hall-Gurney	28	24	10,571	0	4
Hazel	4	1	1,335	0	3
Henne	7	5	10,435	0	2
Iuka and W	11	7	3,600	0	4
Keesling	8	5	1,910	0	3
Kraft-Prusa	92	74	57,189	0	18
Lake City	1	1	343	0	0
Laton	13	13	4,150	0	0
Lindsborg	39	36	20,253	0	3
Lost Springs	22	15	3,154	0	7
Max	4	3	1,006	0	1
McLouth	91	11	538	48	32
Merten	2	2	249	0	0
Morel	12	9	12,526	0	3
Neidenthal	1	1	1,365	0	0
Pawnee Rock and E	3	1	284	1	1
Peace Creek	119	102	84,347	1	16
Ray and SE	37	33	49,146	0	4
Raymond	9	7	4,242	0	2
Ritz-Canton	2	1	10	0	1
Roxbury, S	4	1	3,000	0	3
Rusch	1	1	102	0	0
Russell, N	1	0	0	0	1
St. John	2	1	58	0	1
Silica	33	22	20,099	0	11
Smyres	23	20	11,649	0	3
Stafford	7	3	6,195	0	4
Stickney	4	3	1,751	0	1
Sun City	3	2	6,000	0	1
Stull	2	1	3,000	0	1
Trapp	59	52	38,386	0	7
Westhusin	1	1	267	0	0
Wherry	4	2	250	0	2
Wilkins	7	4	4,283	0	3
Zenith	17	15	5,567	0	2
Zook	1	1	192	0	0
Zyba	2	1	214	0	1
Miscellaneous counties:					
Butler	11	6	751	0	5
Greenwood	16	10	180	1	5
Wildcats	351	37	28,658	3	311
Other	191	76	28,645	24	91
Total	1,519	815	564,592	80	624

Summary of Wildcats Completed in 1942

County—	Comp.	Oil	Prod.	Gas	Dry
Atchison	1	0	0	0	1
Barber	9	1	41	0	8
Barton	26	4	924	0	22
Brown	1	0	0	0	1
Butler	9	2	3,198	0	7
Chase	1	0	0	0	1
Comanche	1	0	0	0	1
Cowley	21	3	2,499	0	18
Decatur	1	0	0	0	1
Dickinson	2	0	0	0	2
Douglas	1	0	0	0	1
Edwards	5	0	0	1	4
Ellis	13	0	0	0	13
Ellsworth	8	1	100	0	7
Finney	1	0	0	1	0
Graham	4	0	0	0	4
Greenwood	7	1	10	0	6
Harper	1	0	0	0	1
Harvey	2	1	9	0	1
Jackson	1	0	0	0	1
Jefferson	14	0	0	0	14
Johnson	1	0	0	0	1
Kearny	1	0	0	0	1
Kingman	2	0	0	0	2
Kiowa	2	0	0	0	2
Leavenworth	11	0	0	1	10
Marion	13	1	75	0	12
McPherson	17	4	3,361	0	13
Morris	1	0	0	0	1
Nemaha	1	0	0	0	1
Ness	1	0	0	0	1
Norton	10	0	0	0	10
Osage	1	0	0	0	1
Pawnee	7	0	0	0	7
Phillips	10	0	0	0	10
Pottawotomie	1	0	0	0	1
Pratt	11	1	684	0	10
Reno	23	3	1,425	0	20
Rice	16	4	6,263	0	12
Rooks	20	5	3,726	0	15
Rush	7	0	0	0	7
Russell	18	2	893	0	16
Saline	9	0	0	0	9
Sedgwick	4	0	0	0	4
Sherman	1	0	0	0	1
Stafford	27	2	5,400	0	25
Sumner	2	2	50	0	0
Thomas	1	0	0	0	1
Trego	2	0	0	0	2
Wallace	1	0	0	0	1
Woodson	1	0	0	0	1
Total	351	37	28,658	3	311

FOREST CITY BASIN

Bartlesville Sand Production Found in Missouri

After drilling some 75 or 80 dry holes over the past 4 years, Missouri gave the Forest City basin its first deep production, in December 1942. Cities Service Oil Co. 1 Jim Cook, 4 miles southeast of Tarkio, NW NW NW 32-65n-39w, found pay in Bartlesville sand. Location of the well is in the center of Atchison County and in the northwest corner of the state.

The well was drilled with a light rotary outfit. Pipe was set at 1,440 ft. and when cement plug was drilled to 1,446 ft., oil rose 100 ft. in the hole after 12 hours and after a second 12 hours a little over 9 bbl. of oil was bailed.

A resume of the Forest City basin activity for 1942 shows that Missouri had at least 19 dry holes, compared with 32 in 1941. No important addition was made to the Polo gas pool in Caldwell County. Richardson County, Nebraska, principal producing area in the basin, had 15 new oil wells and 9 dry holes, compared with 45 oil wells and 23 dry in 1941. Distribution of the 15 new wells was: Five were added to the Dawson pool, 12 miles west of Falls City, of which three were reported to have had pay in the Viola lime and nine were added to the Barada pool, which is north of Falls City.

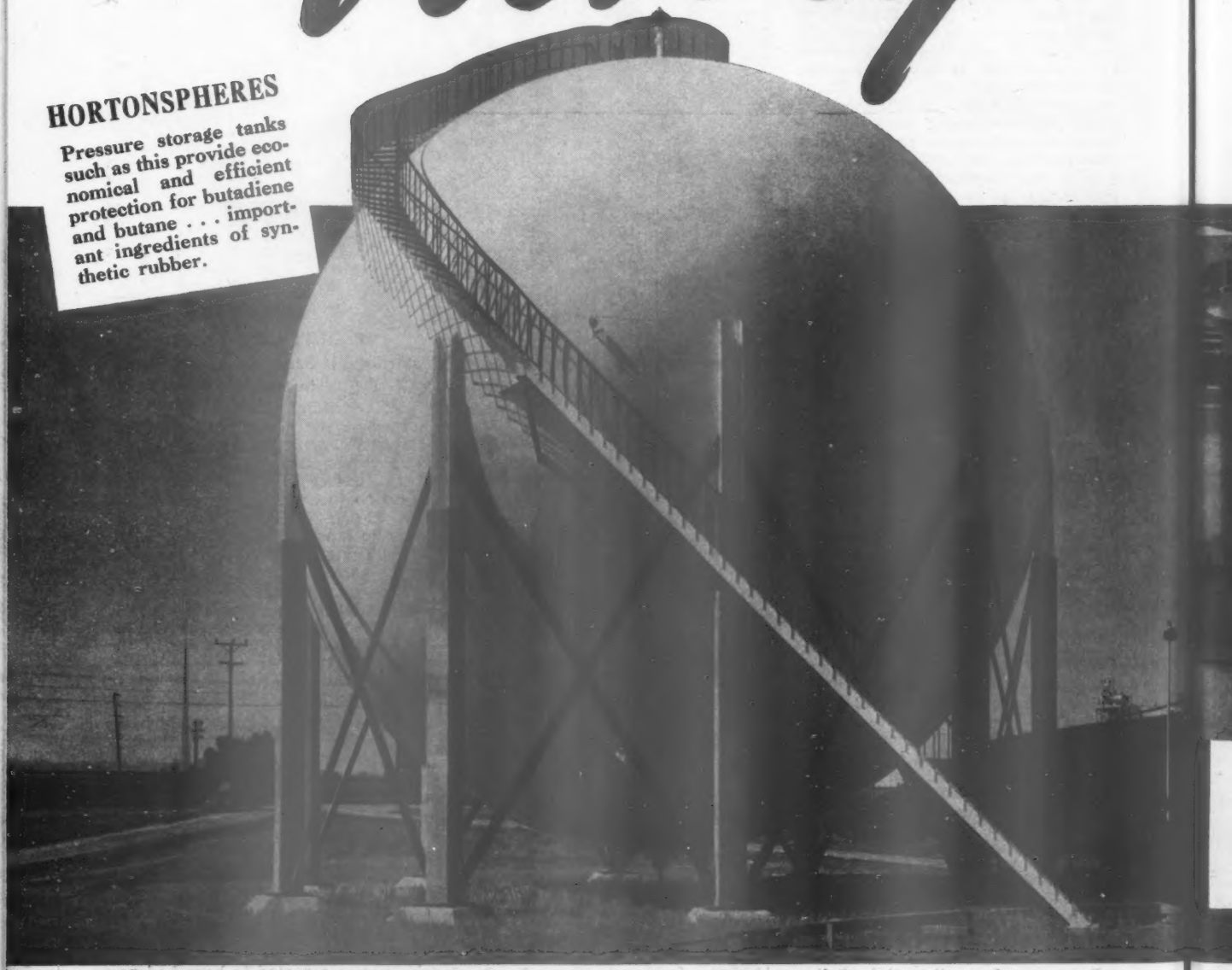
MODERN STORAGE TANKS

. . . that help speed

Victory

HORTONSPHERES

Pressure storage tanks such as this provide economical and efficient protection for butadiene and butane . . . important ingredients of synthetic rubber.



CHICAGO BRIDGE &

BIRMINGHAM - CHICAGO - CLEVELAND - HOUSTON - NEW YORK - PHILADELPHIA

. . because they protect *Fighting Volatiles*

PROTECT essential wartime volatiles from volumetric loss and product deterioration . . . might serve as a victory keynote in the petroleum industry. The United Nations need *more* 100-octane gasoline, *more* butadiene and *more* of other essential volatiles. Modern storage tanks like those shown, are serving the petroleum industry everywhere . . eliminating vapor losses and helping to speed the day of Victory!

HORTONSPHERES

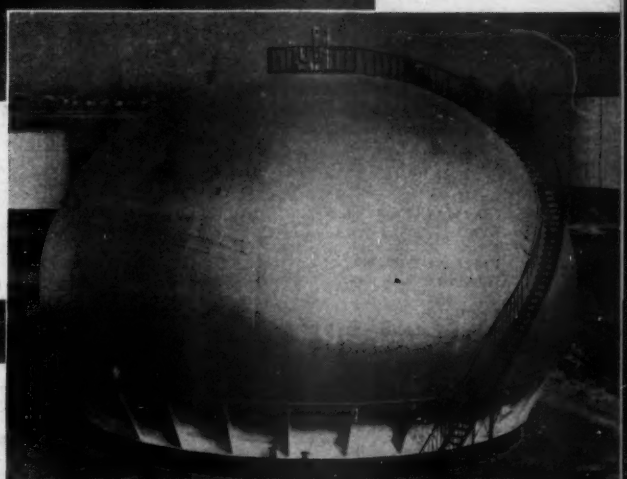
These pressure storage tanks are widely used for handling volatile liquids or gasses. They're built in capacities of 1,000 to 20,000-bbls.—for pressures from 20 to 100-lbs. per sq. in.

WIGGINS PONTOON ROOFS

Primarily recommended for installations on working tanks. Roof floats directly on liquid, thereby preventing all filling losses and practically all breathing losses of volatile liquids. Pontoon Roofs may be installed on new or existing tanks.

HORTONSPHEROIDS

Built in a wide range of standard capacities from 2,500 to 40,000-bbls. for pressures up to 35-lbs. per sq. in. and in capacities up to 120,000-lbs. for pressures of 2½ to 20 lbs. per sq. in.



(Above)

WIGGINS PONTOON ROOFS

This 80,000-bbl. tank is equipped with a Wiggins Pontoon Roof. Substantial savings are reported by the owner, a pipe line company located in Colorado.

(Right)

HORTONSPHEROIDS

This 25,000-bbl. unit is used for storing high vapor pressure blending stock for aviation gasolines at a California refinery.

IRON COMPANY

HAVANA - SAN FRANCISCO - TULSA - WASHINGTON

MICHIGAN

Exploration Extending North Of Present Production

PROSPECTING in Michigan during the past year was considerably slowed by the wartime conditions imposed on operators, but wildcatting still produced more oil discoveries than during 1941. Unfortunately, however, the majority of the pools discovered were small in reserve and limited in area. Although the 1942 discoveries failed to make important producing areas, Michigan rounded out the year with a production record better than in any other period except 1939.

Reserves added during the year by new discoveries, extensions and new pay zones were approximately 10,690,000 bbl., which is 10,947,000 bbl. less than the 1942 production. Fields must be found which will take the place of the Reed City, Headquarters, Winterfield, Adams and the other few flush fields.

Exclusive of three new horizon discovery wells, only one oil field found during 1942 has resulted in the actual development of a field covering more than a highly limited area. This is the Evart field of Osceola County. By the end of the year it had produced 169,000 bbl., the only new field to play an important role in the year's production picture. However, Fork in Mecosta County is regarded as an excellent prospect and future development may bring some of the other new areas into a position where production will be of importance. Some of the other discoveries have been followed by two or more wells but, generally speaking, there is little proven area ahead for development.

One of the most significant exploratory trends during 1942 was the work carried on in the northern part of the state. Three areas were opened in Missaukee County where there had not previously been a commercial oil completion. One of these areas has been recently extended ½ mile north by a second well which flowed at the rate of 67 bbl. an hour when completed, indicating that the county will probably become one of the centers of oil development through the coming year.

Other fields were developed in the far northern part of Roscommon County and the western part of Lake County. While neither of these new prospects has been developed into an important field, they indicate that the northern areas of the state are favorable for discovery of large flush fields. The coming year will probably bring prospecting still farther north into counties such as Wexford, Crawford, and Kalkasha. These counties have been under consideration for some time and large lease blocks have already been taken up.

Discovery of commercial pay zones in the deeper horizons in some of Michigan's pools, stands out as the highlight of 1942 exploration and opens up an entirely new field of development in the state. The fact that wildcatting to the more conventional sands such as the Traverse and Dundee failed to provide a single major discovery during the year has placed much more impetus on these deeper formations. At present five deep areas are producing commercially and at least two more offer commercial prospects. The five producing include Richfield, Headquarters, Norwich, Adams and Winterfield, while the two prospects are Enterprise in Missaukee County and Foster in Ogemaw. Two of these, Richfield and Foster, have deep producing wells or prospective deep production without upper Traverse or Dundee production, which increases interest in the deeper pays still more.

Summary of Wells Completed During 1942

County—	Comp.	Oil	Prod.	Gas	Dry
Allegan	86	31	2,193	0	55
Arenac	36	12	8,674	4	20
Bay	44	43	5,220	0	1
Calhoun	5	0	0	2	3
Clare	76	27	24,400	29	20
Clinton	5	0	0	0	5
Gladwin	10	8	1,354	0	2
Gratiot	7	1	40	0	6
Isabella	14	5	1,813	3	6
Kent	11	2	35	1	8
Jackson	4	0	0	1	3
Lake	29	13	4,240	0	16
Mason	5	0	0	0	5
Mecosta	14	2	782	1	11
Missaukee	23	5	467	4	14
Monroe	4	1	150	0	3
Montcalm	11	0	0	5	6
Newaygo	6	1	1	0	5
Ogemaw	2	2	29	0	0
Osceola	114	90	155,354	17	17
Otsego	3	0	0	1	2
Ottawa	34	12	1,084	2	20
Richmond	1	1	72	0	0
Roscommon	36	27	35,187	0	9
Tuscola	6	3	335	0	3
Van Buren	37	16	983	0	21
Wayne	1	1	5	0	0
Miscellaneous	39	0	0	0	39
Total	663	293	242,418	70	300

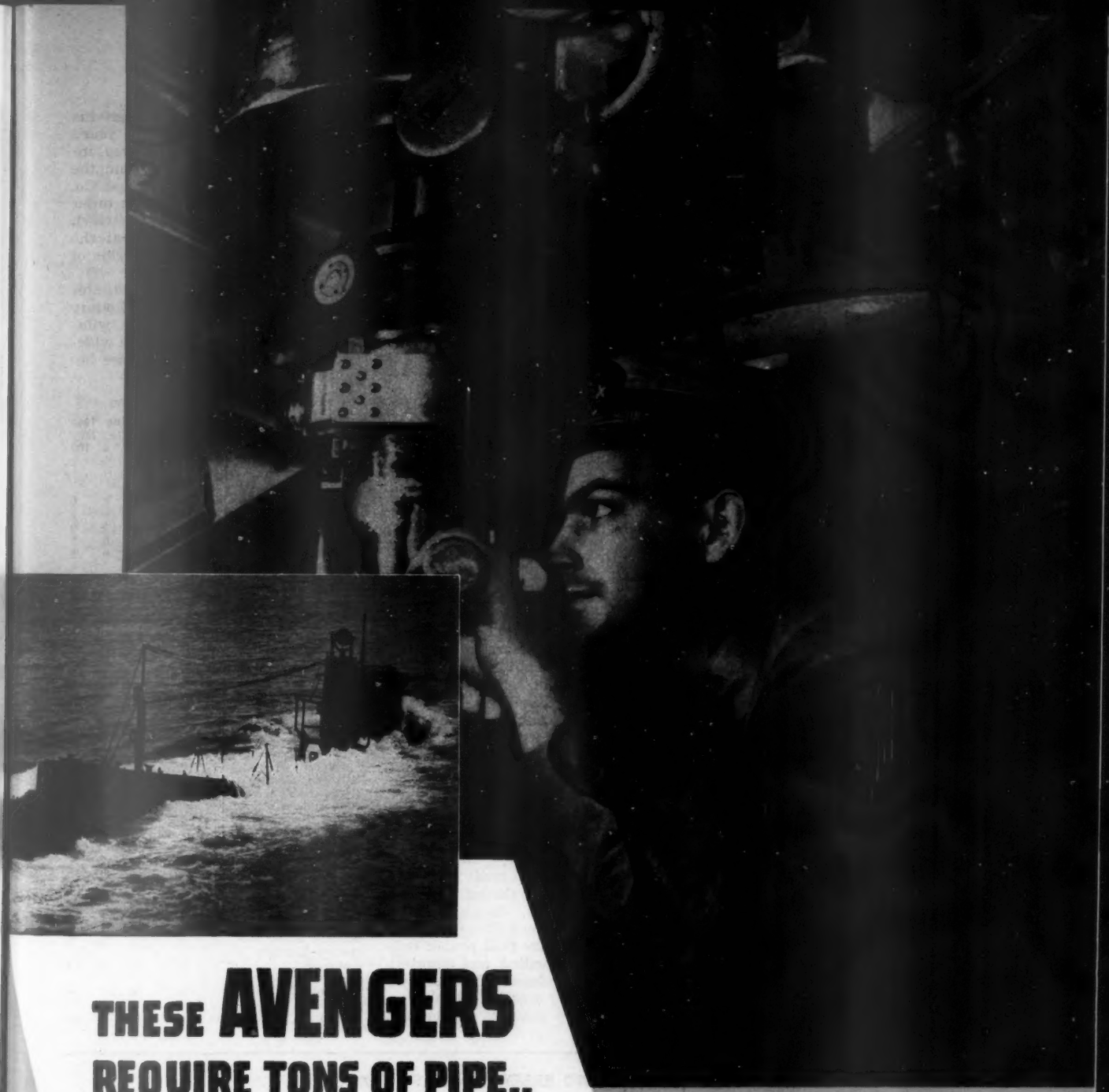
Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	63	36	9	18	144,810
February	57	32	2	23	155,142
March	37	17	0	20	94,772
April	55	32	3	20	154,544
May	56	26	6	24	140,136
June	65	27	8	30	166,610
July	73	24	15	34	172,947
August	61	25	8	28	162,187
September	61	27	5	29	152,913
October	46	15	7	24	116,921
November	55	16	5	34	128,524
December	34	16	2	16	83,454
Total	663	293	70	300	1,672,960

PRODUCTION AND RESERVES—MICHIGAN

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Northern district:				
Adams	1,046	2,595	5,405	48
Beaverton	142	769	731	31
Bentley	83	720	480	36
Buckeye	486	18,709	2,291	275
Clayton	204	3,667	1,133	45
Evart	169	169	1,631	5
Fork	57	57	343	2
Freeman-Redding	861	13,018	1,482	127
Headquarters	2,320	2,634	8,566	37
Ogemaw	333	4,892	1,708	222
Reed City	9,042	11,797	24,203	171
Winterfield	1,237	2,353	4,047	30
Miscellaneous	113	1,341	854	74
Total	16,093	62,748	52,874	1,103
Central district:				
Crystal-Amble	81	7,722	278	46
Greendale	368	21,920	2,680	176
Monitor-Kawkawlin	497	727	4,273	37
Porter-Yost	1,240	39,437	7,563	336
Sherman	169	4,069	631	64
Vernon-Leaton	211	7,608	1,592	76
Wise	227	1,730	870	59
Total	2,793	82,385	17,887	794
Southwestern district:				
Allegan County	1,027	10,229	3,771	480
Van Buren County	770	9,389	611	238
Walker	719	8,725	2,075	530
Miscellaneous	20	6,731	67	5
Total	2,536	35,074	6,724	1,253
Southeastern district:				
Miscellaneous	115	2,016	376	82
Total Michigan	21,537	182,223	77,861	3,232



THESE AVENGERS REQUIRE TONS OF PIPE..

...AND THEY'RE GETTING IT!

America's fighting sea serpents require tons of dependable SPANG PIPE.

Until World Freedom is definitely assured, SPANG Tubular Products are wholeheartedly allotted to our armed forces to do the job they must do first.

Official U. S. Navy Photos

Sold by

SPANG CHALFANT, INC.

General Offices: GRANT BUILDING, PITTSBURGH, PA.

Sales Offices: BOSTON - NEW YORK - PHILADELPHIA
PITTSBURGH - ATLANTA - CHICAGO - ST. LOUIS - TULSA
HOUSTON - DENVER - SAN FRANCISCO - LOS ANGELES

SPANG PIPE

EASTERN TEXAS

Wood County Paluxy Sand Discoveries Start Big Play

by Harry F. Simons

WOOD County with two new major pools, both producing from the Paluxy sand, gave a revival of interest to the East Texas area and provided a place in which to start development in 1943. Just to add a little spice to the situation, the second Paluxy discovery, the Quitman pool, produced high gravity oil, the first such production from that zone in the area. The Coke pool, discovered in June, produced the usual low-gravity crude.

At the end of the year the Coke pool had 25 oil wells and 2 dry holes which did not limit the pool except to the south. The pool was discovered when the Amerada 1 Kennemer, 9 miles north of the town of Whitman, was completed for an initial of 920 bbl. flowing from Paluxy sand topped at 6,262 ft. Casing was perforated from 6,262 to 6,350 ft. The field has enjoyed an active development despite the fact it has no direct pipeline outlet.

The Quitman pool was proven December 1 when the Delta Drilling Co. and Rube Benton 1 Goldsmith, 3 miles northwest of Quitman, was completed for an initial production 726 bbl. per day of 43 gravity oil through ¼-in. choke. At the end of the year, two offset wells had been scheduled.

The Pettit lime paid off well in the Larissa pool in Cherokee County which was discovered by the Humble 1 H. F. Curtiss, 4 miles southwest of Bullard. The well made an initial of 37.42 bbl. of 48 gravity oil through ¼-in. choke along with 65,000 cu. ft. of gas from pay topped at 10,160 ft. and with casing perforated at 10,160 to 10,212 ft. There has been no additional development.

The Kildare pool in Cass County which produces from Gloyd horizon in the Glen Rose section was discovered early in March and at the end of the year had eight wells. Pay in the discovery well, John Messinger 1 Benefield and Singleton, 2 miles northeast of Rodessa pool production, was found at 5,992 ft. The pay section is approximately 200 ft. thick.

Best Woodbine pool uncovered during 1942 was the Weiland pool in Hunt County which had six wells at the end of the year. The discovery well was the Hollandsworth Drilling Co. et al 1 J. D. Baker, 3 miles southwest of Dixon. It made 266 bbl. through ¼-in. choke through perforations at 2,761-73 ft. Having 10 dry holes, the field is practically defined.

In the East Texas pool proper only six wells were drilled and approximately 270 abandoned. The production in the field was held back during part of the year by the lack of transportation facilities although the situation loosened towards the year's end. Salt water injection was increased throughout the year and the East Texas Salt Water Disposal Co. began installing its system. An order by the Railroad Commission, which was being contested in court at the year's end, hastened the conversion of some oil wells to input wells.

Prospects for the next year center around the new pools in Wood County with the possibilities that the wildcatting in the area will be quite widespread and directed toward zones below the Woodbine sand.

EAST TEXAS DISTRICT

Summary of Wells Completed During 1942

Field, county—	Comp.	Oil	Prod.	Gas	Dry
Wildcats	108	4	813	0	100
Bazzette, Navarro	2	0	0	1	1
Cayuga, Anderson-Henderson-Freestone	4	4	480	0	0
Chalk Hill	1	0	0	0	1
Chapel Hill, Smith	30	29	8,392	1	0
Coke, Wood	27	25	10,407	0	2
Concord, Anderson	3	1	201	0	2
East Long Lake, Anderson-Freestone-Leon	1	1	49	0	0
East Texas, Gregg-Rusk-Smith-Upshur-Cherokee	7	5	239	0	2
Ellis	1	0	0	1	0
Flag Lake, Henderson	3	2	40	1	0
Grapeland, Houston	1	0	0	1	0
Hawkins, Wood	149	133	26,852	1	15
Long Lake, Anderson-Freestone-Leon	7	5	396	1	1
Opelika, Henderson	3	0	0	3	0
Pittsburg, Camp	2	2	225	0	0
Pleasant Grove, Rusk	9	4	834	0	5
Powell, Navarro	4	2	61	0	2
Talco, Franklin-Titus	4	3	434	0	1
Van, Van Zandt	1	1	672	0	1
Weiland, Hunt	16	6	1,095	0	10
Wortham, Freestone--Limestone	2	2	61	0	0
Carthage, Panola	4	1	18	1	2
Joaquin, Shelby	3	0	0	0	3
Kildare, Cass	8	8	3,103	0	0
Marion Shallow, Marion	1	1	27	0	0
Waskom, Harrison-Panola	1	0	0	1	0
Total	403	239	54,399	16	148

PRODUCTION AND RESERVES—EAST TEXAS

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
East Texas basin:				
Boggy Creek	72	5,119	881	16
Cayuga	4,026	25,812	97,186	284
Chapel Hill	455	663	9,437	39
East Texas	120,943	1,850,135	2,649,865	25,340
Hawkins	5,265	6,699	193,301	367
Long Lake and East	1,517	6,123	31,397	150
Navarro Crossing	136	5,859	1,341	21
Pittsburg	94	142	858	5
Pleasant Grove	70	90	610	8
Van	3,321	133,221	308,579	592
Miscellaneous	191	3,487	6,953	25
Total	136,082	2,037,350	3,300,410	26,847
Talco zone:				
Sulphur Bluff	1,539	9,397	16,603	73
Talco	9,599	58,244	85,756	746
Total	11,138	67,641	102,359	819
Mexia zone:				
Corsicana	138	16,801	1,509	608
Mexia	565	98,284	7,936	207
Powell	561	115,872	8,128	149
Wortham	168	22,829	2,041	31
Miscellaneous	137	14,483	2,007	39
Total	1,569	268,269	21,621	1,034
Sabine uplift:				
Rodessa	3,136	51,361	23,639	292
Miscellaneous	107	974	1,686	85
Total	3,243	52,335	25,325	377
Southern area:				
Trinity	141	1,897	1,603	15
Miscellaneous	18	359	151	41
Total	159	2,256	1,754	56
Total East Texas	152,191	2,427,851	3,454,469	29,133

LOUISIANA GULF COAST

Gas-Distillate Fields Lead In Importance in Quiet Year

by T. F. Smiley

THE casualty list among wildcat ventures in the Louisiana Gulf Coast during 1942 constituted just three-fourths of the total number, 36 out of 48. Ten oil wells and two gassers made up the rest. As in other areas, there was a precipitate drop in drilling operations, the result of war conditions. There were less than half as many completions, wildcat and field, in the region as there were in 1941, 434 contrasted with 872.

Conspicuous among strikes in this territory was Union Sulphur Co. 1 J. P. Gueno, in Acadia Parish. This wildcat blew out of control last October, and efforts to regain control were still under way when the year closed. A 24-hour gage taken near the end of December showed it was flowing 523 bbl. of 51-gravity distillate and 49,220,000 cu. ft. of gas at total depth of 10,447 ft. A relief well, 2 Gueno, was being drilled, and it was at 10,025 ft.

Ranking high among the year's discoveries was Gulf Refining Co. 1-E Haas-Hirsch, 3 miles southwest of Krotz Springs, in the Branch area of St. Landry Parish, which opened a new gas and distillate pool in December. Completed at total depth of 11,398 ft., plugged back to 9,327 ft., the well flowed 358 bbl. of 50.2-gravity distillate through perforations at 9,316-26 ft. It is the deepest wildcat yet drilled in that area and is on a block of 3,000 acres owned by Gulf.

The Erath field, in Vermilion Parish, saw a renewal of activity as the result of starting construction of recycling plants. Texas Co. had four locations staked in the Erath field at the close of the year. Expected production of the wells is destined for use in these plants. Construction of the recycling plants is part of the program designed to increase the production of aviation gasoline. Most of the acreage in this high-pressure area has been unitized by Texas Co., Tide Water Associated Oil Co., Humble Oil & Refining Co., and Phillips Petroleum Co. to provide the condensate which the plants will require.

Bayou Sale Development

A 1941 discovery, Humble 1 Marin, which opened the Bayou Sale field with 168 bbl. production in St. Mary Parish, set drills to working in 1942, and at the close of the latter year 19 wells had been completed for the twelvemonth. Sixteen of them were producers. Development followed a southward course, and it was believed probable that production would be joined with that of the Bateman Lake field. Gas-distillate production was opened in the extreme southern part of the field from a new sand at 10,703 ft., but development for the most part was in the higher sands. This new sand was found by Atlantic Refining Co. 3 St. Mary Parish Land Co., which was drilled to total depth of 12,000 ft. The new pay was believed to correlate with the producing sand of the Bateman Lake field.

Union Oil Co. of California, after opening a new shallow sand in the upper Miocene in the Whitelake area of Vermilion Parish, was preparing to drill another test in the same district.

A new sand was opened in the University field in East Baton Rouge Parish by William Helis 12 Nelson. Initial production was 194 bbl. from pay at 9,567-72 ft. Texas 2-B La Fourche Basin Levee, in Jefferson

PRODUCTION AND RESERVES—SOUTHEAST LOUISIANA

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Ascension Parish:				
Darrow	536	5,485	4,640	19
Sorrento	50	1,193	407	7
Total	586	6,678	5,047	26
East Baton Rouge Parish:				
University	3,286	11,992	36,783	91
Iberville Parish:				
Bayou Blue	745	1,650	7,350	31
Choctaw	299	3,871	3,129	12
St. Gabriel	1,338	1,860	13,140	23
White Castle	886	6,113	6,387	17
Total	3,537	13,494	30,006	83
Jefferson Parish:				
Barataria	1,080	2,583	9,417	22
Lafitte	3,693	30,230	49,970	59
Westwego	112	124	1,076	4
Total	4,885	32,937	60,463	85
La Fourche Parish:				
Chacahoula	598	1,950	5,550	16
Delta Farms	308	409	4,110	5
Golden Meadow	4,244	13,941	42,569	192
Lake Long	510	2,330	5,170	16
Leeville	1,015	25,305	9,705	82
Raceland	565	2,335	5,365	12
Valentine	269	5,430	2,570	21
Miscellaneous	78	748	852	3
Total	7,587	52,599	75,891	347
Plaquemines Parish:				
Garden Island Bay	1,210	5,987	10,013	33
Grand Bay	1,974	5,182	19,818	38
Lake Washington	141	2,861	1,339	7
Potash	585	1,627	5,613	14
Quarantine Bay	1,955	7,011	18,989	37
Stella	228	428	2,372	5
Venice	1,318	3,531	12,479	26
West Bay	721	1,146	7,094	19
Miscellaneous	139	340	2,260	7
Total	8,371	28,103	79,977	189
St. Charles Parish:				
Bayou des Allemands	219	602	2,098	10
Lake Salvador	859	1,516	8,484	17
Paradis	2,196	3,650	52,350	47
Total	3,274	5,768	62,932	74
St. James Parish:				
Convent	19	103	217	4
La Pice	109	306	894	4
Total	128	409	1,111	8
Terrebonne Parish:				
Bay St. Elaine	183	745	2,055	9
Caillou Island	1,514	32,202	15,798	50
Dog Lake	281	3,677	2,823	11
Gibson and Northeast	1,288	6,518	13,482	19
Lake Barre	104	17,903	1,097	22
Lake Pelto	267	2,525	2,475	14
Lirette	127	250	1,500	7
Miscellaneous	121	727	1,033	3
Total	3,885	64,547	40,263	134
West Baton Rouge Parish:				
Port Allen	192	272	2,235	6
Miscellaneous parishes	81	265	973	6
Total S.E. Louisiana	35,712	217,064	395,684	1,049

Parish, opened the Bay de Chene field, with initial production of 325 bbl. through perforations at 7,470-7,500 ft.

LOUISIANA GULF COAST

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Anse la Butte	8	6	1,337	0	2
Avery Island	2	1	288	0	1
Barataria	2	1	84	0	1
Bastian Bay	3	2	504	0	1
Baton Rouge	1	1	152	0	0
Bay de Chene	3	1	325	0	2
Bayou Blue	6	4	625	0	2
Bayou Choctaw	3	1	555	0	2
Bayou Couba	2	1	373	0	1
Bayou des Allemands	7	5	872	0	2
Bayou Sale	19	16	3,133	0	3
Belle Isle	5	0	0	0	5
Black Bayou	1	1	324	0	0
Bosco	1	1	30	0	0
Caillou Island	1	1	259	0	0
Cameron Meadows	5	1	51	0	4
Chacahoula	6	4	695	0	2
Chalkley	3	3	720	0	0
Charenton	3	3	426	0	0
Delacroix Island	1	1	497	0	0
Delta Farms	7	6	1,422	0	1
East Hackberry	3	2	339	0	1
Edgerly	3	3	0	0	1
Erath	3	2	164	0	0
Fausse Pointe	3	2	327	0	1
Garden Island	5	5	749	0	0
Gibson	2	2	470	0	0
Golden Meadows	4	3	243	0	1
Grand Bay	8	7	2,436	0	1
Gueydan	8	7	1,705	0	0
Horseshoe Bayou	4	3	671	0	1
Iowa	2	2	371	0	0
Jeanerette	1	1	324	0	0
Jefferson Island	1	1	136	0	0
Jennings	2	1	492	0	1
Jug Lake	1	1	454	0	0
Krotz Springs	1	1	358	0	0
Lafitte	6	5	1,257	0	1
Lake Chicot	5	5	1,111	0	0
Lake Long	2	1	405	0	1
Lake Pelto	2	1	384	0	1
Lake Salvador	7	7	2,472	0	0
Lakeside	1	1	74	0	0
Leeville	4	3	577	0	1
Lewisburg	3	2	136	0	1
Lirette	1	1	197	0	0
Lockport	1	1	215	0	0
Neale	9	9	2,290	0	0
New Iberia	4	2	465	0	2
North Crowley	2	2	914	0	0
Paradis	29	27	11,266	1	1
Pine Prairie	17	15	4,393	0	2
Port Allen	4	3	747	0	1
Port Barre	11	7	1,360	1	3
Potash	4	2	617	0	2
Quarantine Bay	3	3	760	0	0
Raceland	4	4	948	0	0
Rapides	3	1	32	0	2
Richie	3	2	165	0	1
Roanoke	4	1	120	0	3
St. Gabriel	3	3	601	0	0
Schooner Bayou	5	4	1,296	0	1
Sorrento	1	1	60	0	0
South Roanoke	2	1	7	0	1
Starks	6	4	517	1	1
Stella	4	2	380	0	2
Sulphur	3	2	132	0	1
Thornwell	1	1	40	0	0
University	3	3	566	0	0
Unknown Pass	2	1	21	0	1
Venice	8	6	1,585	0	2
Vermilion Bay	1	1	292	0	0
Ville Platte	20	19	3,242	0	1
Vinton	11	6	1,060	0	5
West Bay	4	3	520	0	1
W. Cote Blanche	7	6	1,120	0	1
West Gueydan	3	2	407	0	1
West Hackberry	7	4	1,353	0	3
W. Lake Verret	3	3	941	0	0
West Mermentau	3	3	489	0	0
Westwego	2	1	194	0	1
White Castle	1	1	159	0	0
Miscellaneous	64	0	0	1	63
Total	434	286	67,778	6	142

LOUISIANA GULF COAST

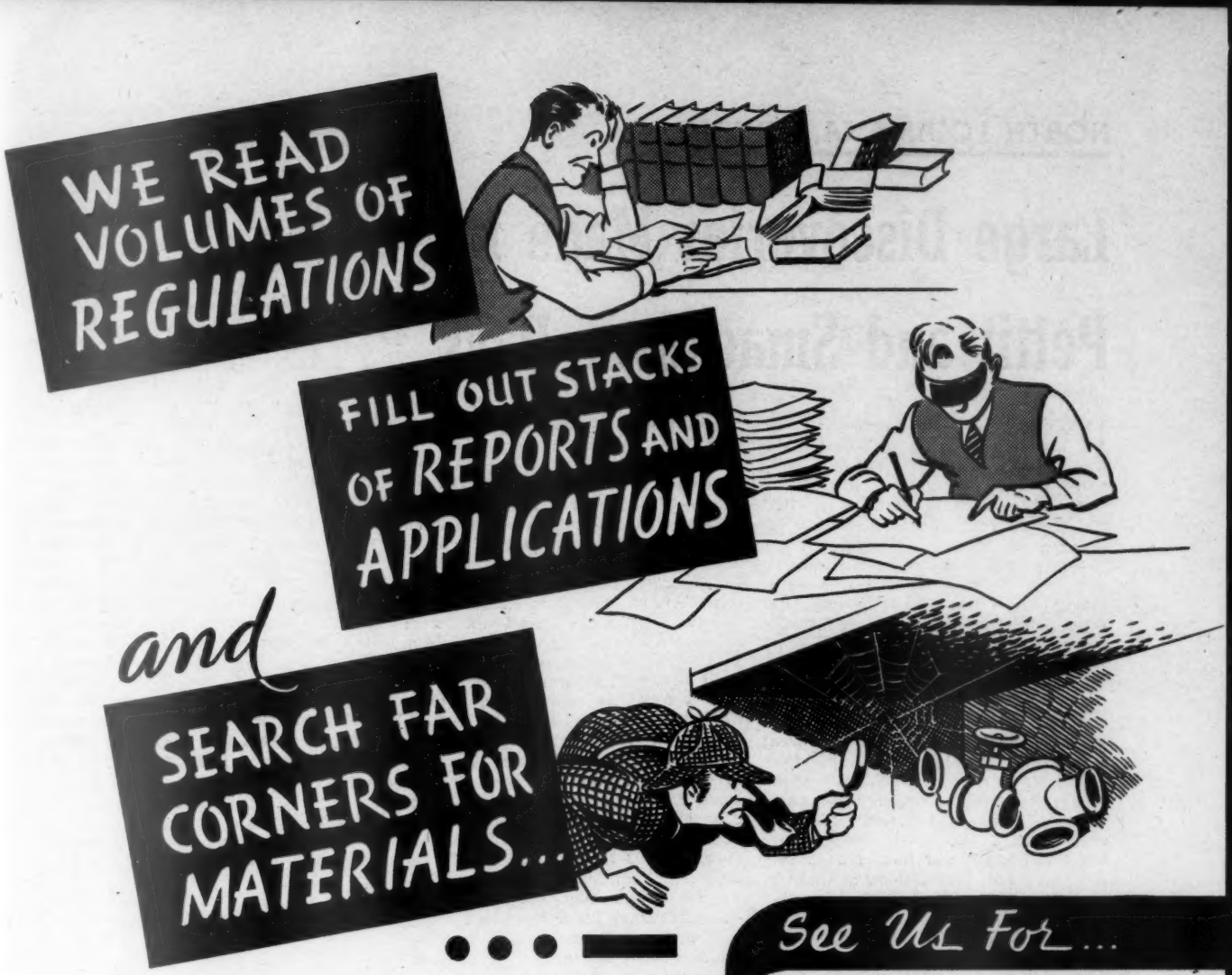
Summary of Wildcats Completed in 1942

Parish—	Comp.	Oil	Gas	Dry
Ascension	1	0	0	1
Avoyelles	5	0	0	5
Calcasieu	3	1	0	2
Cameron	2	0	0	2
East Baton Rouge	1	1	0	0
Evangeline	1	0	0	1
Iberia	2	0	0	2
Iberville	3	0	0	3
Jefferson	2	2	0	0
La Fourche	4	0	1	3
Livington	1	0	0	1
Orleans	2	0	0	2
Pointe Coupee	1	0	0	1
Rapides	2	1	0	1
St. Charles	3	2	0	1
St. James	1	0	0	1
St. Landry	4	1	0	3
St. Martin	1	0	0	1
St. Tammany	1	0	0	1
Terrebonne	5	1	1	3
Vermilion	3	1	0	2
Total	48	10	2	36

PRODUCTION AND RESERVES—SOUTHWEST LOUISIANA

(In thousands of barrels)

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Acadia Parish:				
Bayou Mallet	99	428	772	5
Bosco	1,416	23,516	16,483	54
Jennings	4,563	86,134	48,866	150
North Crowley	1,772	6,600	15,400	43
Richie	256	411	2,589	7
Tepetate	1,011	11,499	8,501	44
Miscellaneous	80	311	839	5
Total	9,197	128,899	93,450	308
Avoyelles Parish:				
Eola	3,365	11,987	48,013	96
Beauregard Parish:				
Bancroft	358	3,136	6,464	32
Neale	802	1,972	14,028	13
Total	1,160	5,108	20,492	45
Calcasieu Parish:				
Edgerly	125	8,937	1,485	15
Gillis	904	22,136	8,984	44
Iowa	2,501	48,743	17,857	64
Lockport	305	15,841	2,659	21
Starks	189	3,493	1,767	22
Sulphur	789	16,620	7,480	68
Vinton	433	45,376	3,624	52
Total	5,245	161,146	43,856	286
Cameron Parish:				
Black Bayou	883	9,752	8,246	20
Cameron Meadows	666	8,775	6,375	38
Chalkley	1,866	4,733	15,267	33
Creole	453	2,039	7,561	7
East Hackberry	1,615	26,700	15,500	62
West Hackberry	1,878	12,462	15,538	71
Grand Lake	1,183	4,391	10,609	22
Sweet Lake	596	6,153	847	16
Miscellaneous	26	44	224	2
Total	9,168	75,049	80,167	271
Evangeline Parish:				
Pine Prairie	804	1,061	939	25
Ville Platte	6,820	21,675	56,325	209
Total	7,624	22,736	57,264	234
Iberia Parish:				
Bayou Pigeon	250	551	2,449	5
Fausse Point	80	191	809	7
Jefferson Island	288	1,155	2,345	10
New Iberia	2,302	26,960	18,040	82
Vermilion Bay	146	403	1,197	2
Total	3,066	29,260	24,840	106
Jefferson Davis Parish:				
Roanoke	9,140	9,762	5,238	17
South Roanoke	210	1,145	1,855	9
Woodlawn	795	3,526	6,574	22
Miscellaneous	71	916	523	23
Total	10,216	15,349	14,190	54
Rapides Parish:				
Cheneyville	933	3,765	8,735	34
St. Landry Parish:				
Port Barre	969	10,995	9,005	50
St. Martin Parish:				
Anse La Butte	2,267	5,062	19,938	65
Happytown	129	324	1,176	2
Lake Chicot	88	110	990	6
Plumb Bob	95	387	813	4
West Lake Verret	871	1,822	8,178	18
Miscellaneous	98	2,014	736	4
Total	3,548	9,719	31,831	99
St. Mary Parish:				
Bateman Lake	137	1,056	1,544	4
Bayou Sale	939	1,060	10,940	20
Charenton	1,432	9,841	16,759	158
Horseshoe Bayou	343	787	3,583	9
Jeanerette	778	10,450	6,670	19
West Cote Blanche	445	890	4,490	6
Total	4,074	24,084	43,983	216
Vermilion Parish:				
Abbeville	85	770	1,050	10
East White Lake	236	221	2,179	4
Erath	197	382	2,218	9
Gueydan	822	2,571	7,429	22
West Gueydan	194	720	1,780	7
Total	1,534	4,664	14,656	52
Miscellaneous parishes	10	27	83	3
Total S.W. Louisiana	60,019	502,788	490,555	1,854
Total Louisiana Gulf	95,731	719,852	886,239	2,903



WE PROBABLY HAVE THE MATERIALS YOU NEED OR CAN TELL YOU HOW TO OBTAIN THEM . . . . . .

The Petroleum Industry has been recognized as being vital to our final Victory. Essential Materials can be obtained if you follow the prescribed Government procedure.

LET US HELP YOU

See Us For...

WHEELING PRODUCTS
- STANDARD PIPE
- CONTINUOUS WELD LINE PIPE
- LAPWELD CASING
- BLACK AND GALVANIZED SHEETS
- GALVANIZED ROOFING
- WELDED WIRE FABRIC
- EXPANDED METAL

PITTSBURGH STEEL COMPANY
- SEAMLESS CASING
- SEAMLESS TUBING
- SEAMLESS DRILL PIPE

AMERICAN CHAIN AND CABLE CO.
- TRULAY AND CRESCENT BRAND WIRE ROPE

OIL WELL SUPPLIES
PLUMBING AND MILL SUPPLIES
KOHLER ELECTRIC PLANTS
WEBER ENGINES
ATLAS PUMPING UNITS
MYERS WATER SYSTEMS
JONES SUCKER RODS

ATLAS SUPPLY CO.

MUSKOGEE, OKLA., U.S.A.
Branches in principal oil fields

Subsidiary of
WHEELING STEEL CORPORATION

NORTH LOUISIANA, ARKANSAS

Large Discoveries Made in Pettit and Smackover Pays

DEVELOPMENT in the North Louisiana-Arkansas area shifted from the Wilcox trend which was predominant in 1941, especially throughout Central Louisiana, to the deeper Pettit and Smackover limes in the northern Louisiana fields.

Total completions in North Louisiana were 446 in 1942, compared with 792 in 1941, a drop of 44 per cent. The ratio of oil wells to total completions, however, was raised slightly this year to approximately 60 per cent. Wildcat completions for 1942 held up fairly well in comparison with 1941, which was considered an active year

The most active spot in the area continues to be the Haynesville pool of Claiborne Parish. Out of 121 wells reported completed during 1942, only 1 was a failure. The field expanded rapidly along the north side and by the end of the year had crossed the Arkansas line into Columbia County at Navarro Oil Co.'s 1 Beene. Smackover porosity was found at 5,453-78 ft. and the well flowed 163 bbl. of oil a day.

In Arkansas the Midway pool of Lafayette County was the most active spot. This pool developed rapidly through the first part of the year but over the past 2 months has been less active. Barnsdall and Southwood Oil Co. were the principal operators in the field. As the year ended, the only drilling was at the eastern tip of the field, which Southwood had extended considerably. The field has been defined by dry holes on all sides with the exception of this eastern section. In 1942, 39 wells were drilled in the field, of which 29 were oil wells.

A number of rank wildcats were drilled in Arkansas in 1941. In Pope County, in the northern part of the state, Arkansas Louisiana Gas Co. brought in a good gas well at its 1 Ladd & Strong, NE SW SW 22-10n-21w. The well flowed 26,000,000 cu. ft. of gas a day from sands at 2,475-2,512 ft. and 2,802-17 ft. Total depth was 2,830 ft. Location is near the small town of Silex and about 15 miles east of Clarksville in Johnson County.

A new pool was opened in Catahoula Parish, 15 miles from nearest production, at Eugene Jordan 1 Louisiana Central, in 22-9n-5e. The well was drilled to 4,554 ft., with no shows at that depth and was plugged back to test the Sparta sand at 1,810 ft. Perforations in the sand resulted in a small well of about 75 bbl. potential. The location is 2 miles northeast of the town of Manifest.

Discovery of good pay in Pettit lime north of the old Carterville pool in Bossier Parish aroused considerable interest. Brought in in December, H. L. Hunt 1 Nebo, SW SE SE 3-23n-12w, just south of the Arkansas State line, flowed 400 bbl. of oil a day in lime at 6,029-6,122 ft. The name North Carterville was given to the new pool. It is midway between Haynesville and Rodessa and operators were hopeful of developing another field on the order of Haynesville, where production is also from the Pettit lime.

In Sharkey County, West Central Mississippi, British-American Oil Producing Co. opened the Gary pool at its 2 Houston, SW NW NW 23-11n-7w. The well flowed 300 bbl. of 25-gravity oil in 3 hours from chalk at 3,263-65 ft. The same company's first test, the 1 Houston, also had pay in the chalk but was plugged because of water. The new pool is close to both rail and barge terminals.

NORTH LOUISIANA

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Bellevue	4	1	5	1	2
Caddo	44	24	1,245	0	20
Carterville	3	1	10	0	2
Catahoula Lake	2	2	600	0	0
Converse	1	1	35	0	0
Cotton Valley	1	0	0	1	0
De Soto-Red River	2	0	0	0	2
Haynesville	121	120	49,447	0	1

PRODUCTION AND RESERVES

(In thousands of barrels)

NORTH LOUISIANA

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Bellevue	210	12,603	2,397	171
Caddo	2,607	155,523	31,967	1,650
Converse	125	2,415	1,085	85
Cotton Valley	4,989	38,347	46,653	170
Cross Lake	981	5,457	10,043	45
De Soto-Red River	355	57,117	4,183	130
Haynesville	4,607	75,013	48,987	404
Homer	1,035	71,034	9,566	350
Lake St. John	110	110	1,090	4
Little Creek	1,334	1,860	12,640	60
Lisbon	781	10,020	6,480	210
Miscellaneous	272	6,219	2,703	79
Nebo	3,285	4,218	23,782	128
Rodessa	4,178	75,869	32,831	430
Sarepta	86	3,011	539	30
Sligo	817	3,369	9,131	64
South Jena	168	208	2,192	7
Sugar Creek	359	1,443	3,957	31
Summerville	210	256	2,144	7
Trout Creek	128	136	1,464	6
Urania	782	32,890	7,110	270
Willow Lake	101	106	1,094	2
Zwolle	270	14,698	2,802	52
Olla	4,650	9,784	35,216	187
Total	32,500	581,706	300,056	4,578

ARKANSAS

Atlanta	1,044	2,991	5,009	22
Big Creek	46	121	2,879	3
Buckner	755	3,481	7,419	28
Champagnolle	269	15,282	2,718	72
Dorcheat	606	1,731	17,369	27
El Dorado	369	48,706	3,894	190
East El Dorado	129	9,601	1,199	50
Fouke	324	525	3,075	6
Garland City	85	2,112	788	9
Irma-Troy	610	9,630	5,770	112
Lewisville	65	546	654	19
Lisbon	59	864	636	135
Macedonia	372	396	11,604	18
Magnolia	6,386	24,733	155,367	115
McKamie	750	1,721	35,779	18
Midway	1,216	1,216	16,784	32
Mount Holly	131	141	5,869	9
New London	59	59	2,941	12
Nick Springs	134	621	1,389	13
Patton	13	26	174	1
Rodessa	370	6,487	3,113	60
Schuler and East	5,907	32,433	57,547	174
Smackover	4,884	380,432	54,568	1,610
Stephens	643	7,384	6,616	220
Urbana	919	7,133	7,867	52
Village	421	1,567	3,033	13
Total	26,566	559,939	414,061	3,030

MISSISSIPPI

Pickens	126	622	578	4
Pickens-Sharpsburg	303	311	1,689	8
Tinsley	27,106	46,706	87,022	360
Miscellaneous	11	15	85	1
Total	27,546	47,656	89,374	373

Cutting off a worn sprocket rim with acetylene torch

YOUR "Caterpillar" track-type Tractor gets much of its pulling power from the tracks on which it runs.

So in these days when every ounce of machine power counts for victory, you'll want to give special care and attention to tracks. There are many things you can do to prolong track life. Here are some:

1. Keep the rollers, idlers and diagonal brace bearings lubricated. This should be done more frequently if your tractor operates in mud or water.
2. Keep the track tension correct, and the front idlers in alignment, so that wear will be evenly distributed.
3. Don't abuse the machine. A "Caterpillar" track-type Tractor is built to take a lot of punishment, but it will run longer and more efficiently if you avoid undue shocks and overloading.
4. Go over the nuts and bolts periodically to be sure they're tight. Look — and listen — for signs of wear.

When tracks are worn to the point of needing repair, your "Caterpillar" dealer's excellent service facilities are available night and day, ready to:

1. Turn track pins and bushings. In some cases this will actually double track life.
2. Cut off worn sprocket rims and weld on new rims.
3. Build up the rail side of worn track links.
4. Build up worn rollers by welding.
5. Weld new grousers on track shoes.
6. Switch rollers, especially if your equipment puts extra load on the front, rear or one side of the tractor.

All these types of track service save metal—vital in today's war effort. Your "Caterpillar" dealer is pledged to keep your "Caterpillar" equipment working with the least possible expenditure of war-needed materials. Call on him for counsel, service and repairs, and ask him for a copy of the useful new booklet, "Keep 'em Working."

Building up track shoes with new grousers

CATERPILLAR

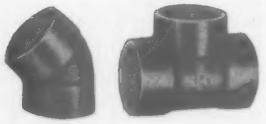
REG. U.S. PAT. OFF.

DIESEL

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!

When you see it on Fittings



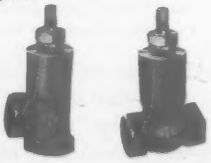
WHEN you use Watson-Stillman high-pressure, high-temperature Forged Steel Fittings for *all* of your needs, you can save yourself trouble *now* and save yourself money *in years to come.* The extra endurance of these Forged Steel "heavy weights" outweighs their cost. That's true economy, true conservation this year and any year.

The Watson-Stillman line includes screwed fittings and socket welding fittings, designed with more than ample metal sections and built with uniform wall thickness.

90 degree elbows, tees, 45 degree elbows, crosses, street elbows, laterals and crosses are forged solid from steel billets. Couplings, reducers, bushings, caps and plugs are machined from solid bars.

Bulletin A-3 lists all available Watson-Stillman fittings.

When you see it on Valves



THE double diamond W-S trademark on a valve assures you of the same heavy-duty sturdiness that it stands for when you see it on a fitting.

Watson-Stillman makes bronze and forged steel globe, angle and check valves for high-pressure, high-temperature service, therefore giving you a margin of safety on lower pressures.

New valves have been added to make the line of greater use. Like Watson-Stillman fittings, these valves are available through mill supply distributors.

Bulletin A-4 describes and illustrates these valves.

FREE *Just write us on your business letterhead and ask for Bulletin A-3 on Fittings and Bulletin A-4 on Valves.*

WATSON-STILLMAN

Engineers and Manufacturers of Forged Steel Valves and Fittings, Hydraulic Machinery and Equipment—Hydraulic Presses, Pumps and Jacks

The Watson-Stillman Co., Roselle, N. J.

3133

Field—	Comp.	Oil	Prod.	Gas	Dry
Hemphill	1	1	129	0	0
Homer	3	3	72	0	1
Lake St. John	4	4	380	0	0
Lisbon	4	2	32	2	0
Little Creek	17	12	1,831	1	4
Monroe	16	0	0	13	3
Nebo	62	52	2,295	0	10
Olla	9	3	319	0	6
Pine Island	4	4	220	0	0
Shreveport	3	3	262	0	0
Sligo	10	9	268	0	1
Sugar Creek	4	2	146	1	1
Trout Creek	5	1	290	0	4
Vivian	2	1	30	0	1
Zonoria	3	3	223	0	0
Wildcats	85	3	487	0	82
Miscellaneous	35	21	399	1	13
Total	446	272	58,705	20	153

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	50	28	5	26	193,130
February	47	25	0	22	194,877
March	30	20	0	10	119,685
April	45	32	0	13	197,740
May	28	23	0	5	126,552
June	30	20	0	10	141,673
July	39	31	0	8	101,888
August	36	26	1	9	169,328
September	33	14	5	14	157,266
October	13	8	0	5	82,584
November	44	23	6	15	178,063
December	41	22	3	16	163,863
Total	445	272	20	153	1,826,649

ARKANSAS

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Atlanta	2	2	708	0	0
Big Creek	1	1	55	0	0
Buckner	2	1	104	0	1
Dorcheat	7	6	912	0	1
El Dorado	4	2	55	0	2
Fouke	5	4	1,111	0	1
Hillsboro	4	4	85	0	0
Macedonia	10	8	1,144	0	2
McKamie	8	3	306	1	4
Midway	39	29	2,922	0	10
Mount Holly	3	3	250	0	0
New London	7	6	675	0	1
Nick Springs	1	0	0	0	1
Patton	1	1	57	0	0
Rainbow	1	1	116	0	0
Schuler	6	2	221	2	2
Smackover	4	3	102	0	1
Stephens	16	11	1,703	0	5
Village	1	1	195	0	0
Wildcats	46	6	1,609	4	36
Miscellaneous	16	9	165	0	7
Total	184	103	12,495	7	74

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	13	5	3	5	80,631
February	10	2	3	5	48,536
March	18	14	0	4	107,738
April	14	9	0	5	81,087
May	10	5	0	5	60,276
June	13	11	0	2	70,372
July	18	12	0	6	101,888
August	21	8	0	13	106,725
September	19	11	0	8	115,332
October	13	8	0	5	82,584
November	19	10	1	8	91,154
December	16	8	0	8	86,443
Total	184	103	7	74	1,032,766

MISSISSIPPI

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Tinsley	2	2	675	0	0
Wildcats	15	0	0	0	15
Total	17	2	675	0	15

ALABAMA

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Wildcats	4	0	0	0	4

FLORIDA

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Wildcats	4	0	0	0	4

Tensleep Production at Elk Basin Is Most Important Discovery of Year

by T. R. Ingram

FIELD development in the Rocky Mountain area (Colorado, Wyoming and Montana) showed decreases all down the line in 1942 as compared with 1941. In the three states combined there were 362 wells completed as against 477 in the preceding year, a decrease of 115 wells or 24.1 per cent. Of oil wells completed there were 226 which compares with 300 in 1941, a decrease of 74 or 24.7 per cent. New production in 1942 was 45,896 bbl. against 77,396 in 1941, a loss of 31,500 bbl. or 40.7 per cent. The number of gas wells in the area was almost the same, there being 76 in 1942 against 80 in 1940. Dry holes decreased from 98 to 54, a drop of 44 or 46.9 per cent.

Wildcats drilled in the three states showed some interesting results. A total of 24 which may be classed as of major importance, having been drilled on geological structures, were completed during the year. Seven of these were in Colorado, eleven in Wyoming and six in Montana. Eleven of the 24 resulted in discoveries of varying importance, of which three were primary discoveries, four were discoveries in deeper horizons and four were gas discoveries. The percentage of discoveries to total wells drilled was 45.8 per cent. Colorado had seven wildcats, all of which were dry and abandoned. Wyoming had 11 wildcats of which one was a primary discovery, four were discoveries in deeper horizons and two were gas discoveries, the ratio being seven out 11 or 63.6 per cent. Montana had six wildcats of which two were primary oil discoveries and two were gas discoveries, the ratio being four out of six or 66.6 per cent. Included in the oil discoveries are several of minor importance which may be classed as little better than indicative of future possibilities.

Elk Basin Discovery

The most important of the oil discoveries was drilled by the Minnelusa Oil Corp., joint with the Yale Oil Corp., in the southern part of the Elk Basin field in Wyoming. It found production in the Tensleep, a deeper horizon. It flowed around 80 bbl. an hour beaned down. The significance of the find is that it indicates the entire field, an excellent structure which has produced more than 11,000,000 bbl. of light oil from shallow pays, ultimately will be developed in that horizon and rank among the largest black oil fields in the state.

The General Petroleum Corp. brought in a primary discovery on Horse Creek in southeastern Wyoming which made 580 bbl. initial from the Dakota sands. It subsequently showed some water, the source of which is now being determined. It is significant in that it is located on the northwestern rim of the Denver basin and presages a wildcat play in northeastern Colorado.

The Superior Oil Co., joint with the British-American Oil Producing Co., found a 750-bbl. well in the Tensleep, a deeper pay, in the Pilot Butte field in Wyoming. Subsequently another discovery in the Embar line was made. At first it ranked rather large, but subsequent development will have to prove whether it will be classed as a major find.

A 10-bbl. well in the Wasatch was completed on the North Hiawatha field in Sweetwater County, Wyo-

PRODUCTION AND RESERVES—ROCKY MOUNTAIN AREA

(In thousands of barrels)

WYOMING

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Big Muddy	402	23,387	7,253	147
Byron	1,693	5,863	14,137	22
Cole Creek	376	885	5,215	19
Dallas Derby	151	3,285	1,645	41
Elk Basin	179	11,573	2,077	146
Frannie	1,155	6,672	11,348	25
Garland	503	6,579	4,591	19
Grass Creek	1,451	30,244	20,046	343
Hamilton Dome	405	5,923	8,857	34
La Barge	931	8,018	9,272	144
Lance Creek	8,023	48,837	60,163	218
Lost Soldier	2,390	25,759	23,341	83
Mahoney Dome	377	1,137	3,233	9
Maverick Springs	796	1,332	7,348	35
Medicine Bow	244	3,852	2,348	8
Mule Creek	130	1,660	1,040	44
Oregon Basin	4,427	19,852	48,318	73
Osage	203	4,939	1,641	201
Pilot Butte	175	743	1,537	10
Poison Spider and South Casper Creek	239	3,185	2,315	34
Quealy Dome	180	1,375	2,125	16
Rex Lake	126	369	1,051	3
Rock River	934	21,592	8,068	56
Salt Creek	4,719	302,930	50,290	19
Wertz	2,281	6,386	29,614	19
Miscellaneous	244	24,810	6,520	92
Total	32,736	571,187	333,393	1,860

MONTANA

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Kevin and Border	1,941	42,021	20,979	1,120
Cut Bank	5,537	31,369	64,631	668
Cat Creek	140	14,420	1,380	118
Pondera	258	6,171	2,829	152
Dry Creek, etc.	169	3,306	2,744	31
Total	8,045	97,287	91,663	2,189

COLORADO

	1942 prod.	Cumulative to Jan. 1, 1943	Estimated reserves Jan. 1, 1943	No. of wells
Iles	532	9,591	5,469	25
Fort Collins-Wellington	112	7,263	1,335	21
Hiawatha	185	498	2,328	9
Moffat	125	5,930	1,070	10
Price	386	1,464	3,536	10
Rangely	273	1,124	2,726	18
Wilson Creek	568	1,440	13,360	8
Miscellaneous	128	16,010	1,440	65
Total	2,309	43,310	31,274	166

FACTS ABOUT Sub-Surface Control OF SURFACE FREEZING with an OTIS REMOVABLE BOTTOM HOLE REGULATOR

1. Freezing of Surface Connections is positively eliminated.
2. Flowing Pressures are reduced to safe workable limits.
3. The principal point of pressure reduction is moved to a depth of several thousand feet.
4. Natural formation heat absorbs all drop in temperature resulting from gas expansion.
5. The tubing acts as a "mile long" heater—the most practical heater known.
6. Rate of production is easily controlled by adjusting the surface choke.
7. The regulator can be run or pulled under pressure on an ordinary steel measuring line.
8. Otis Service crews are available for installation in all major fields.

OTIS PRESSURE CONTROL, INC.
DALLAS, TEXAS

PRESSURE CONTROL · OTIS · SERVICE - EQUIPMENT

Branches: Houston and Corpus Christi, Texas; Hobbs, New Mexico; New Iberia, Louisiana; Magnolia, Arkansas

Representatives: Otis Eastern Service, Inc. Wellsville, New York; Western Pressure Control, Los Angeles and Bakersfield, California

Export Office: 74 Trinity Place, New York City

ming, by the Vermillion Oil Co. It was a primary discovery, or an extension of East Hiawatha, and an account of the lenticular nature of the sands, it may pave the way for additional and profitable exploration.

The most important discovery in Montana was a Madison lime producer on the Twin Rivers structure, northwest of Cut Bank and near the Canadian line. While it made only 85 bbls. additional, it opened an area with considerable prospects of a favorable nature.

WYOMING

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Baxter Basin	1	0	0	1	0
Big Sand Draw	1	0	0	1	0
Byron	4	4	1,375	0	0
Circle Ridge	9	9	1,715	0	0
Cole Creek	7	7	857	0	0
Elk Basin	1	1	1,920	0	0
Frannie	5	5	1,344	0	0
Garland	2	1	200	0	1
Grass Creek	1	1	150	0	0
Horse Creek	1	1	580	0	0
La Barge	4	4	268	0	0
Lance Creek	12	12	2,057	0	1
Lost Soldier	2	2	715	0	0
Mahoney	2	2	200	0	0
Notches	1	1	300	0	0
Oregon Basin	27	27	12,173	0	0
Osage	3	1	4	0	2
Pilot Butte	5	4	1,480	0	1
Poison Spiler	1	1	31	0	0
Rock River	2	2	385	0	0
Sherrard	3	0	0	3	0
Shoshone	1	1	200	0	0
South Elk Basin	1	0	0	1	0
Wakeman Flats	3	0	0	0	3
Wertz	7	7	3,325	0	0
Miscellaneous	12	0	0	0	12
Total 1942	119	93	29,469	6	20
Total 1941	161	123	48,549	5	34
Difference	42	30	19,080	1	14

MONTANA

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Apex	1	0	0	1	0
Bowdoin	43	0	0	42	1
Cedar Creek	11	0	0	10	1
Conrad Butte	1	0	0	1	0
Cut Bank	87	75	11,213	3	9
Hardin	2	0	0	2	0
Kevin-Sunburst	65	46	2,141	7	12
Midway	2	1	5	1	0
Reagan	1	1	85	0	0
Miscellaneous	5	0	0	0	5
Total 1942	218	123	13,444	69	26
Total 1941	283	160	24,972	71	52
Difference	65	37	11,528	2	26

COLORADO

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
East Hiawatha	2	2	390	0	0
Powder Wash	1	0	0	1	0
Rangely	7	4	230	0	3
Wilson Creek	4	4	2,363	0	0
Miscellaneous	11	0	0	0	11
Total 1942	25	10	2,983	1	14
Total 1941	33	17	3,875	4	12
Difference	8	7	892	3	2

NORTHWEST NEW MEXICO

Summary of Wells Completed During 1942

Field—	Comp.	Oil	Prod.	Gas	Dry
Barker	3	0	0	3	0
Hospah	12	11	532	0	1
Wilcox	1	0	0	1	0
Miscellaneous	5	0	0	0	5
Total 1942	21	11	532	4	6
Total 1941	19	6	373	8	5
Difference	2	5	159	4	1

Canadian Production at Peak

by Victor Lauriston

CRUDE-PETROLEUM (including natural gasoline) production for all Canadian fields for 1942 reached a new high of 10,359,267 bbl., according to preliminary estimates, which may be modified slightly by the final production figures. This total compares with 10,101,149 bbl. produced in 1941, which was the previous record figure.

Petroleum Production, 1941-42

Field—	Production 1941	Production 1942	Prod. wells Jan. 1942	Prod. wells Dec. 1942
Turner Valley:				
Shallow crude	6,014	5,892	3	3
Gas wells	27,096	26,205	43	36
Limestone crude	9,504,111	9,663,200	177	196
Natural gasoline	293,122	303,911	(4 plants)	
Red Coulee	11,626	9,989	7	7
Wainwright	11,773	14,533	6	6
Vermilion	20,499	66,720	5	15
Taber	4,655	32,006	1	2
Del Bonita	4,906	782	1	1
Tilley	0	2,138	0	1
Lloydminster	416	0	1	0
Steveville	18,707	10,610	2	1
Dina-Ribstone	2,854	380	2	2
Athabaska tar sand	0	10,541	0	0
Total Alberta	9,905,779	10,145,907	248	260
New Brunswick	22,332	27,760	0	0
Ontario	158,919	150,000	0	0
Northwest Territories	14,119	35,600	0	0
Total	10,101,149	10,359,267	248	260

In the Turner Valley field of Alberta, there was still some expansion of the proven area, mostly in the north. Early in 1942, Atlas-British Dominion 2, LSD 4, 17-21-3w5, came in a large producer, extending the proven field ½ mile or more to the north.

The good results secured in a series of wells in the south half of Township 21 led to a rapid extension of the drilling area toward the north and west, tests being started as far north as Inland-Sarcee 1, LSD 2, 4-23-4w5, 10¾ miles north and 4½ miles west of Atlas-British Dominion 2. Drilling ocntinued active till about May, when Ace Royalties 2, LSD 10, 22-22-4w5, was abandoned at 8,244 ft. with the drill stem still in the lower Benton.

The possibilities even of the proven area of the Turner Valley field have not been exhausted. There are, it is estimated, more than 90 well locations still open in proven territory, with good prospects of extension of the productive areas. At the end of the year 20 outfits were drilling, with several wells near completion: but it is estimated that 30 outfits should be in continuous operation to maintain the present production.

The most noteworthy feature of the year was the expansion of the heavy crude production in the Vermilion field of eastern Alberta. With the completion of 10 additional producers, the output was stepped up from 20,499 bbl. in 1941 to 66,720 bbl. in 1942. The heavy crude was contracted to the Canadian National Railways for fuel oil, to replace the imported product, sand and water being removed by a processing plant in the field. In the latter part of the year the processing plant shut down, claiming that the amount allowed for processing was inadequate to cover the cost. This had a detrimental effect on new development. Meanwhile, Cannar Oils, a subsidiary of the Canadian National Railways, is planning a 50-well drilling program to provide railway fuel, with possibilities that these operations will later be expanded. Imperial Oil during the year drilled several tests in the Mannville, Claysmore, and other outlying areas but failed to secure production.

The later half of the year was marked by the drilling in the Taber field of the largest crude producer in Alberta outside Turner Valley. Standard of British Columbia 1, LSD 9, 18-9-16w4, got production at 3,181 ft., just above the lime, with initial flow of 330 bbl. daily of 18.3° crude. A second test by Standard and two by Hi-Test Petroleums, all at some distance from discovery, failed to secure production: Hi-Test Petroleums 3 is now drilling an offset to the discovery well.

Another hopeful area was opened early in the year when Northwest Co. 2, LSD 4, 17-17-12w4, encountered a crude production of 80 bbl. daily of 24° crude at 3,180 ft. in the Tilley area, in southeastern Alberta. Half a dozen later wells failed to extend the production, and drilling is now being extended to outlying areas.

Earlier in the year, considerable attention was given to the possibilities of meeting wartime crude requirements by intensive utilization of the tar sands of the Athabaska district. The separation and refining plant of Abasand Oils, destroyed by fire in the fall of 1941, was reconstructed and reopened in May, and has maintained a fair output. A federal government committee was appointed to investigate the possibilities of economic development of the bituminous sands, and some preliminary work has been done in this direction.

Details of these operations have, however, not been made public; and the same policy has been adopted by the federal government with reference to government-sponsored development undertaken last spring in the Fort Norman field of the far north and continued through the summer and fall. Considerable new drilling is understood to have been done, which is only partially reflected in the increase of the Fort Norman production from 14,119 bbl. in 1941 to 35,600 bbl. in 1942, as, for lack of storage and transportation facilities, completed wells might have to be shut in. A pipe line to Whitehorse, in the Yukon Territory, has been mooted in connection with the Fort Norman development. Completion of the Alaska Highway provides an immediate and very large demand for petroleum products from this area, and may lead to the further testing of potential fields farther south, in the Great Slave Lake and Hay Lakes areas, and elsewhere.

Summary of Wells Completed During 1942 Alberta

Field—	Comp.	Oil	Prod.	Gas	Dry
Turner Valley:					
Southwest	1	1	557	0	0
West Central	11	11	4,307	0	0
North	5	4	3,446	0	1
North extension	16	13	16,854	0	3
Tilley	7	1	80	1	5
Wainwright	1	1	8	0	0
Steveville	2	0	0	1	1
Vermilion	13	7	240	0	6
Taber	4	1	330	0	3
Medicine Hat	1	0	0	1	0
Kinsella	2	0	0	1	1
Monogram	2	0	0	1	1
Miscellaneous	13	0	0	0	13
Total	78	39	25,822	5	34

New Indiana Pools Small in Extent

ALTHOUGH wildcatting was widespread throughout Indiana during 1942, little success was encountered as far as the discovery of a new field of major importance. Several discoveries were reported but, even though many of these were heralded by large discovery wells, the areas proved to be limited in production and extent.

Twelve new pools, including new pay zones in the older fields, were opened in Indiana during the year, all of which were in the southwestern part of the state. Outstanding among the 1942 discoveries was the opening of the Devonian lime to production in the Dodds Bridge area of the Shelburn field, Sullivan County. At the close of the year 5 wells had been completed in this horizon and all of them had reported initial production of between 150 and 200 bbl. All other discoveries proved disappointing with only single-well pools resulting in most cases.

Activity, as has been the case for the past several years, centered in Gibson and Posey counties with the Hazleton, Griffin and Caborn fields receiving the greater part of the development. However, interest in Trenton and sub-Trenton production in northeastern Indiana increased throughout the year and many deep tests were under way in the area at

the close of the year. Two of these tests, in Randolph County about 2 miles east of the old Trenton gas field, had encountered production in the Trenton lime and were testing at the rate of about 120 bbl. of oil daily. These wells are about 1 mile apart and show prospects of opening a large pool in the area. Another of these deep tests, in Adams County, had encountered a showing of oil in the Jordan sand at 2,261 ft. and had 5-in. casing set for a test at the close of the year. The Jordan sand is considerable below the St. Peter sand and this show has greatly increased interest in the deep tests under way in this part of the state.

With reserves on the decline and no prospects for increasing either reserves or production in sight at the close of the year, the outlook in Indiana is anything but encouraging. No pools discovered in 1942 offer any additional acreage for development and most of the proven acreage in the older fields has already been developed. Exploration will probably continue to be centered in the southwestern part of the state but prospecting in the northeastern areas is gaining headway and many major operators in the state are already beginning to show interest in the possibilities of deep production in these areas of Indiana.

Gas Discoveries Take Lead in Ohio

MOST of the new pools and extensions chalked up in Ohio during the past year resulted primarily in gas discoveries, thereby increasing the reserves needed to supply the demand for natural gas by industries engaged in war production. The search for new oil was continued but successes for the most part were confined to the extension of existing pools.

The Clayton pool in Perry County, one of the most important developments of Pennsylvania Grade oil in the Appalachian region, was extended out of Clayton Township ½ mile northward into Madison Township by a 55-bbl. producer. Westward extension was also made by three wells, each making better than 100 bbl. It now appears possible that the pool may join with the old East Somerset pool, 2 miles farther west.

The Thron pool in northwestern Perry County witnessed some drilling throughout the year. The pool is small in size, covering only 600 acres. A 40-bbl. well was completed about midyear, extending production ¼ mile to the southeast. Tests were also made in attempt to extend the pool to the east and south but these were unsuccessful.

Among the Central Ohio fields, the Hinckley gas pool in Medina County was the most active throughout the year. Attempts at southern extensions to this field during the year failed to result in commercial production, but in view of the peculiar characteristics of the Clinton sand and the fact that tests farther south made fair gas showings, southern extensions may still be developed.

Other extensions of importance during 1942 included the south and northeast extensions of the Gaysport pool and the north extension of the Clinton oil pool, both in Muskingum County. Most of the activity in the Gaysport pool was centered in the southern end with one of the state's largest gas wells of the year being completed on the extreme southern edge of the field. A 495-bbl. well marked the slight northward extension of the Clinton pool, but a test ½ mile north was completed dry, indicating that the northern limits of the field have been defined.

Oriskany sand prospecting in Ohio resulted in the discovery of a new gas field in Guernsey County by completion of a fairly large gas well. A second test drilled 1 mile northeast gaged only about one-half the volume of the discovery and the pool is not expected to cover a large area.

Sub-Trenton tests in the state during the year failed to find any commercial production, but prospectors did not lose interest in the possibilities of these deeper formations and many more tests are planned for the coming year.

THE DURAMETALLIC TWIST

1. Processed to retain lubrication.
2. Provides readier response to gland pressure.
3. Distributes frictional load over several diagonally wrapped metallic sheets.
4. Originated by DURAMETALLIC.

THERE'S A WAR TO BE WON! Pump room performance is important! This is no time to handicap the efficiency of your pumps with make-shift packing . . . specify DURAMETALLIC twisted, flexible metallic packing and be assured of long runs, better sealing and friction-free service.

FREE ENGINEERING SERVICE ON YOUR PACKING PROBLEMS

LET US RECOMMEND THE RIGHT TYPE PACKING FOR YOUR NEEDS

The PERFECT SEAL

DURAMETALLIC CORPORATION

KALAMAZOO MICHIGAN

HOUSTON • LOS ANGELES • CHICAGO • NEWARK • NEW ORLEANS
DETROIT • SAN FRANCISCO • SEATTLE • TULSA • MONTREAL • YOUNGSTOWN, O.
FREDERICKSBURG, VA. • KANSAS CITY • MINNEAPOLIS

THE NATION'S MAJOR FIELDS

by W. V. Howard

A LITTLE more than half of the nation's production continued to come from fields producing more than 10,000 bbl. daily, although the proportion of oil provided by these fields is slightly less than during 1941. As shown in Table 1, there were a number of declines in production from the major fields, the largest being in Salem, Illinois. Many of these declines reflect marketing conditions due to lack of transportation facilities, this accounting for practically all of the declines in West Texas. Other changes in production are due to the additional markets provided certain fields, either due to proximity to transportation systems or to the desirability of the oil for war purposes.

Comparing the table showing production of the 75 largest fields with those of former years, the lack of new fields which suddenly rise to levels of high production is noticeable.

The estimates of proven reserves in all fields are presented in other parts of this issue and a check of the fields having more than 100,000,000 bbl. of recoverable reserve is presented in Table 2. Of the 37 fields listed only one, Hawkins, is a recent discovery and the majority are more than 10 years old. These 37 fields contain more than half of the nation's estimated recoverable reserve, so that the need for major discoveries to replace dwindling reserves in many of the largest fields is apparent.

In Table 3 is listed all of the fields

(Continued on Next Page)

TABLE 1—PRODUCTION OF 75 MAJOR FIELDS

(In thousands of barrels)

	1942	1941	Diff.
East Texas	120,943	130,637	—9,694
Wilmington, Calif.	33,696	30,682	—3,014
Tinsley, Miss	27,106	15,564	11,542
Oklahoma City	26,484	32,183	—5,699
Midway-Sunset, Calif.	20,440	17,468	2,972
Coalinga Dist., Calif.	19,285	14,222	5,063
Louden, Ill.	17,961	22,918	4,957
Salem, Ill.	14,705	29,539	—14,834
Bradford-Allegany, Pa.-N. Y.	14,450	17,231	—2,581
Eunice-Monument, N. M.	13,820	16,016	—2,196
Gray County, Tex.	13,654	12,507	1,148
Ventura Ave., Calif.	13,649	12,882	767
Conroe, Tex.	13,589	11,747	1,842
Long Beach, Calif.	13,124	14,712	—1,588
Kettleman, Calif.	13,015	13,987	—972
Griffin - Keensburg - New Harmony, Ill.-Ind.	12,588	17,251	—4,663
Huntington Beach, Calif.	12,108	10,755	1,453
Hutchinson County, Tex.	11,399	9,805	1,594
K.M.A., Tex.	11,219	10,224	995
Hastings, Tex.	10,555	7,817	2,738
Trapp-Sellens, Kans.	9,726	7,577	2,149
Talco, Tex.	9,599	9,002	597
Wasson, Tex.	9,401	13,170	—3,769
Silica-Raymond, Kans.	9,063	7,615	1,448
Reed City, Mich.	9,042	2,859	6,183
Hendrick-Kermit, Tex.	8,417	10,010	—1,593
Lance Creek, Wyo.	8,023	8,919	—896
Dominguez, Calif.	7,924	8,506	—582
Santa Fe Springs, Calif.	7,763	8,559	—796
Rodessa, Ark., La.-Tex.	7,684	10,451	—2,767
Slaughter, Tex.	7,531	4,808	2,723
Mount Poso, Calif.	7,517	4,117	3,100
Yates, Tex.	7,481	6,719	762
Goldsmith-Harper, Tex.	7,269	9,276	—1,987
Cowden-Foster, Tex.	6,917	10,838	—3,921
Ville Platte, La.	6,820	5,028	1,792
Tom O'Connor, Tex.	6,770	5,675	1,095
Inglewood, Calif.	6,749	4,893	1,856
Magnolia, Ark.	6,386	7,118	—732
Schuler & E, Ark.	5,907	6,026	—119
Kern River, Calif.	5,737	4,322	1,415
St. Louis, Okla.	5,687	6,997	—1,310
Cut Bank, Mont.	5,537	4,997	540
Coles Levee, Calif.	5,437	5,617	—180
Thompson, Tex.	5,405	4,617	788
Benton, Ill.	5,391	5,769	—378
West Ranch, Tex.	5,303	3,690	1,613
Dale-Hoodville, Ill.	5,294	6,195	—901
Johnsonville, Ill.	5,146	5,913	—867
Bemis-Walters, Kans.	4,971	4,866	105
McElroy, Tex.	4,916	4,819	97
Smackover, Ark	4,884	5,355	—471
Ten Section, Calif.	4,813	5,237	—424
Howard-Glasscock, Tex.	4,812	4,740	72
Sal Creek, Wyo.	4,719	5,076	—357
Haynesville, La.	4,607	939	3,668
Jennings, La.	4,563	6,047	—1,484
Olla, La.	4,560	4,242	318
Oregon Basin, Wyo.	4,427	2,682	1,745
Carson County, Tex.	4,398	3,696	702
Elk Hills, Calif.	4,362	3,492	870
Withers-Magnet, Tex.	4,239	3,527	712
Golden Meadow, La.	4,244	4,511	267
Burnett, Kans.	4,097	3,291	806
Hall-Gurney, Kans.	4,057	3,520	537
Cayuga, Tex.	4,028	4,211	—183
Montebello, Calif.	3,956	4,895	—939
Round Mountain, Calif.	3,927	2,815	1,112
Hull-Silk, Tex.	3,819	3,821	—2
Coyote West, Calif.	3,785	3,075	710
Anahuac, Tex.	3,740	4,667	—927
Rural Hill, Ill.	3,738	1,570	2,168
Earlsboro, Okla.	3,718	3,757	—39
Brea Olinda, Calif.	3,714	2,077	1,637
Lafitte, La.	3,693	4,835	—1,142
Total	749,473	748,193	—1,280
Per cent	53.5	53.4	
Total 75 largest fields of 1941		763,620	
Per cent		54.5	

TABLE 2—RESERVES REMAINING IN MAJOR FIELDS

(In thousands of barrels)

	Age in years	Remaining reserve	Estimated ultimate	Per cent remaining
East Texas	13	2,649,865	4,500,000	59
Conroe, Texas	12	557,268	700,000	80
Coalinga, dist., Calif.	43	479,707	885,145	54
Slaughter, Texas	7	457,049	471,320	97
Wasson, Texas	7	411,101	453,650	91
Yates, Texas	17	395,528	672,900	59
Tom O'Connor, Texas	9	366,304	400,000	92
Webster, Texas	6	337,371	350,000	96
Goldsmith-Harper, Texas	9	334,556	380,000	88
Hastings, Texas	9	329,172	375,000	88
Wilmington, Calif.	8	326,283	400,000	81
Van, Texas	14	308,579	442,800	70
Kettleman, Calif.	15	304,786	570,000	53
Gray County, Texas	22	276,778	476,390	58
Anahuac, Texas	8	266,154	290,000	92
Eunice-Monument, N. M.	14	259,726	381,000	68
K.M.A., Texas	13	254,497	288,880	88
Hutchinson County, Texas	22	237,540	405,850	59
West Ranch, Texas	5	228,676	240,000	95
Midway-Sunset, Calif.	43	227,128	1,150,000	20
Bradford-Allegany, Pa.-N. Y.	73	221,568	665,000	33
Hendrick-Kermit, Texas	17	196,273	462,550	42
Hawkins, Texas	2	193,301	200,000	97
Thompson, Texas	12	176,187	225,000	78
Elk Hills, Calif.	24	172,901	335,000	52
Cowden-Foster, Texas	13	168,916	214,500	79
Magnolia, Ark.	5	155,387	180,000	86
Ventura Avenue, Calif.	28	147,691	400,000	37
Oklahoma City, Okla.	14	134,932	708,320	19
Penwell-Jordan, Texas	14	132,745	166,510	80
Huntington Beach, Calif.	23	121,881	435,000	28
Long Beach, Calif.	22	119,698	780,000	15
Vacuum, N. M.	14	118,380	135,000	88
McElroy, Texas	17	110,229	236,600	47
Louden, Ill.	5	107,760	195,400	55
Seminole, Texas	7	104,633	110,000	94
South Ward, Texas	15	101,088	145,170	70
Total		11,490,428	19,426,895	59

whose estimated ultimate recovery amounts to more than 100,000,000 bbl. Of the 93 fields listed, 56 have future recoverable reserves of less than 100,000,000 bbl. The major fields of Oklahoma, Illinois and California have all been depleted to more than 67 per cent of their original recoverable oil content. Wyoming, Arkansas and Kansas are in practically the same position but in these states there is one old, largely depleted field and the dependence of these states on 100,000,000-bbl. fields is less than that of others.

The dependence of California, Texas and New Mexico on major fields is plainly evident, whereas other states such as Louisiana and Kansas get the bulk of their oil from medium-sized fields. From the state totals presented, Texas and New Mexico are the only ones which still have more than half of their estimated ultimate production in the ground, both in the major fields and in the smaller-sized ones which supplement them.

TABLE 3—PRODUCTION RECORD AND RESERVES OF MAJOR FIELDS

(In thousands of barrels)

	Age in years	Estimated ultimate prod.	Prod. to Jan. 1, 1943	Remaining reserve	Per cent remaining
CALIFORNIA					
Midway-Sunset	43	1,150,000	932,872	227,128	20
Coalinga district	43	885,145	405,438	479,707	54
Long Beach	22	780,000	660,302	119,698	15
Kettleman	15	570,000	265,214	304,786	53
Santa Fe Springs	24	570,000	484,938	85,062	15
Huntington Beach	23	435,000	313,119	121,881	28
Ventura Avenue	28	400,000	252,309	147,691	37
Wilmington	8	400,000	73,717	326,283	81
Kern River	44	385,000	330,815	54,015	14
Elk Hills	24	335,000	162,099	172,901	52
Dominguez	20	212,000	138,178	73,822	35
Inglewood	19	210,000	132,443	77,557	37
Brea Olinda	54	205,000	171,608	33,392	16
Coyote, West	34	180,000	129,232	50,768	28
Santa Maria	42	175,500	144,980	30,520	18
Torrance	21	140,000	107,280	32,720	23
Seal Beach	17	128,000	92,866	36,134	28
Mount Poso	20	120,000	57,785	62,215	52
Richfield	24	120,000	95,014	24,986	20
McKittrick	56	115,000	94,157	21,843	19
Santa Maria Valley	9	100,000	29,701	70,299	70
Total		7,615,645	5,065,067	2,550,578	33
State total		9,248,332	6,054,018	3,194,314	35
Per cent		82	83	80	..
TEXAS					
East Texas	13	4,500,000	1,850,135	2,649,865	59
Conroe	12	700,000	142,732	557,268	80
Yates	17	672,900	277,372	394,528	59
Gray County	22	476,390	199,612	276,778	58
Slaughter	7	471,320	14,271	457,049	97
Hendrick-Kermit	17	462,550	286,277	195,273	42
Wasson	7	453,650	42,549	411,101	91
Van	14	442,800	133,221	308,579	70
Hutchinson County	22	405,850	168,200	237,650	59
Tom O'Connor	9	400,000	33,696	366,304	92
Goldsmith-Harper	9	380,090	45,434	334,556	88
Hastings	9	375,000	45,828	329,172	88
Webster	6	350,000	12,929	337,371	96
Anahuac	8	290,000	23,846	266,154	92
K.M.A.	13	288,880	34,383	254,497	88
West Ranch	5	240,000	11,324	228,676	95
McElroy	17	236,600	126,371	110,229	47
Thompson	12	225,000	48,829	176,187	78
Cowden-Foster	13	214,500	45,084	168,916	79
Hawkins	2	200,000	6,699	193,301	97
Electra	32	171,000	143,678	27,322	16
Pennwell-Jordan	14	166,510	33,765	132,745	80
Burkburnett	32	155,000	135,321	19,679	13
Howard-Glasscock	16	153,000	104,829	48,171	31
South Ward	15	145,170	43,082	101,088	70
Talco	7	144,000	58,244	85,756	60
Big Lake	20	139,300	99,302	39,998	29
Carson County	21	135,390	42,466	92,924	69
Humble	38	135,000	127,587	7,413	6
Spindletop	42	130,000	126,301	3,699	3
Powell	20	124,000	115,872	8,128	7
McCamey	18	110,420	60,951	49,489	45
Seminole	7	110,000	5,367	104,633	94
Mexia	23	106,200	92,284	13,916	13
West Columbia	29	105,000	84,393	20,607	20
Barbers Hill	27	105,000	75,727	29,273	28
Hull	25	105,000	94,053	10,947	10
Cayuga	9	103,000	5,812	97,188	93
Total		14,129,204	4,977,826	9,151,378	66
State total		19,392,828	7,636,000	11,756,828	61
Per cent		73	65	78	..
KANSAS					
El Dorado	26	211,300	182,397	28,903	13
Silica-Raymond	12	121,160	52,561	68,599	57
Trapp-Sellens	14	118,300	46,005	72,295	62
Total		450,760	280,963	169,797	38
State total		2,070,920	1,174,101	896,819	43
Per cent		22	24	20	..

	Age in years	Estimated ultimate prod.	Prod. to Jan. 1, 1943	Remaining reserve	Per cent remaining
NEW MEXICO					
Eunice-Monument	14	381,000	121,274	259,726	68
Hobbs	15	160,000	100,801	59,199	37
Vacuum	14	135,000	16,620	118,380	88
Total		676,000	238,695	437,305	65
State total		994,510	344,873	649,637	65
Per cent		68	69	67	..
WYOMING					
Salt Creek	35	353,200	302,930	50,270	14
Lance Creek	25	109,000	48,837	60,163	55
Total		462,200	351,767	110,433	23
State total		904,580	571,187	333,393	37
Per cent		51	62	33	..
OKLAHOMA					
Oklahoma City	14	708,320	573,388	134,932	19
Cushing-Shamrock	31	400,620	362,432	38,188	10
Glenn-Sapulpa	38	274,960	255,091	19,869	7
Burbank	23	254,400	208,523	45,877	18
Healdton	30	225,100	193,379	31,721	14
St. Louis district	16	176,500	160,554	15,946	9
Seminole district	17	174,810	152,076	22,734	13
Bristow-Slick	30	154,940	138,786	16,154	11
Earlsboro district	17	219,010	188,259	30,751	14
Little River district	16	144,790	131,763	13,027	9
Bowlegs	17	133,850	120,815	13,035	10
Tonkawa	22	130,600	121,966	8,634	7
Fitts	10	108,750	97,406	11,344	10
Hewitt and West	24	108,700	96,105	12,595	11
Total		3,215,350	2,800,543	414,807	13
State total		6,206,192	5,084,966	1,121,226	18
Per cent		50	56	37	..
ARKANSAS					
Smackover	21	435,000	380,482	54,518	13
Magnolia	5	180,000	25,633	154,367	86
Total		615,000	406,115	208,885	34
State total		944,322	530,261	414,061	44
Per cent		65	77	50	..
MISSISSIPPI					
Tinsley	4	103,730	46,708	57,022	55
State total		107,390	47,656	59,734	56
Per cent		98	98	98	..
ILLINOIS					
Bridgeport	37	274,400	230,083	44,317	16
Salem	5	215,300	166,998	48,302	23
Louden	5	195,400	87,640	107,760	55
Robinson	37	165,600	148,712	16,888	10
Total		850,700	633,433	217,267	26
State total		1,399,870	930,081	469,789	34
Per cent		61	68	46	..
PENNSYLVANIA-NEW YORK					
Bradford-Allegany	73	665,000	443,432	221,568	33
State total		1,318,277	1,169,967	248,310	19
Per cent		50	38	89	..
LOUISIANA					
Caddo	38	287,490	155,523	131,967	17
Jennings	42	135,000	86,134	48,866	36
Haynesville	22	124,000	75,013	48,987	36
Total		546,490	316,670	229,820	29
State total		2,422,784	1,301,558	1,121,226	46
Per cent		23	24	21	..
Major fields—U. S.		29,330,079	15,561,219	13,768,860	46
Total United States		44,193,312	24,262,962	20,496,319	46
Per cent		66	64	67	..

East Texas' Future Directly Related To Return of Water to Woodbine Sand

This is the first of two articles by the author on water injection in East Texas, and how the operators are taking steps to maintain the energy available to get maximum recovery from the field

by Harry F. Simons

THE unusual thing about the East Texas field is that it is so typical. It will probably become the textbook example of not only a stratigraphic-trap-type pool but also of the applied principles of reservoir control, the value of sound production practices, and the utilization of energy available to get the maximum recovery from an oil reservoir.

There has never been an oil field which presented so many problems and which in turn had available so much technical talent for their solution. And yet there is probably no other field in which the per-barrel charge for laboratory and field research and investigation is so low because of the huge volume of oil.

The field oddly enough typifies the hesitancy with which technical advances are accepted. The remarkable thing is not the ability of technicians to predict what would happen in East Texas if certain withdrawal programs were followed but that their reasonings should be proved before the field was irretrievably damaged.

In recent months a controversy of considerable proportions has existed on how the withdrawals from the field shall be controlled in the future. Typical reluctance to accept a new method, regardless of its soundness, delayed the application of an oil-water ratio as a means of allocating production. With the volumetric withdrawal from the reservoir in force, the world's largest oil field will rank high as an example in conservation.

Currently the principal problem is the installation of facilities to return salt water to the Woodbine sand from which it is produced. In fact, so dependent is the production of oil on the return of the salt water that right now much more attention is being paid to getting the salt-water-injection program in full swing than there is to the more or less routine business of getting the oil out of the ground. Program and installations of the East Texas Salt Water Disposal Co., which will be responsible for the return of the bulk of the water to the formation, will be discussed in a subsequent article.

Recent Production History

The recent production trend in the East Texas pool has been what was predicted for it shortly after the field was developed. The only change of any significance has been the introduction of gas-lift systems using gas brought from Chapel Hill and the slow change in consideration of salt water as nuisance to be disposed of to that of a means or tool for getting more oil out of the ground quicker. The recent production trend and the decline in bottom-hole pressure have confirmed the engineers' predictions regarding the dangers which would result from improper fluid control.

The conditions in the East Texas field are judged on the records kept and tests made by the Railroad Commission with the operators checking these data with those gathered by the East Texas Engineering Committee. The Railroad Commission tests 98 wells monthly while Engineering Committee tests 358 wells. Data of the two organizations agree reasonably well, although as far as the bottom-hole

Effects of trying to dispose of water by surface evaporation and downstream elimination

TABLE I

Date—	Average b.h.p. at —3,300 ft.	Allow. prod. for b.h.p. period	Daily average allow. prod. b.h.p. period	Daily average salt-water production	No. plants	Bbl. water injected
1940:						
1-8	1,061.35	13,140,787	422,735	.....	..	.....
2-8	1,063.82	12,440,567	401,309	.....	9	22,000
3-8	1,065.51	12,495,466	430,878	.....	..	.....
4-8	1,059.95	12,510,148	403,553	179,681	..	.....
5-8	1,056.16	11,806,867	393,629	.....	..	.....
6-8	1,059.61	11,806,562	380,921	.....	..	.....
7-8	1,064.14	10,291,697	343,057	.....	..	.....
8-8	1,063.60	12,561,164	405,199	.....	..	.....
9-8	1,060.80	11,530,080	371,939	187,811	..	.....
10-8	1,059.68	11,007,506	366,917	.....	..	.....
11-8	1,057.76	11,525,866	371,802	205,492	..	.....
12-8	1,054.39	10,998,514	366,617	.....	..	.....
1941:						
1-8	1,051.73	10,491,177	338,425	.....	31	60,000
2-1	1,050.95	8,899,671	370,820	.....	..	.....
3-1	1,050.45	9,942,479	355,089	.....	..	.....
4-1	1,047.22	11,559,169	372,876	387,653	..	.....
5-1	1,047.64	10,887,853	362,928	.....	..	.....
6-1	1,042.29	11,348,169	366,070	.....	..	.....
7-1	1,034.63	10,854,336	361,811	.....	..	.....
8-1	1,038.48	10,367,382	334,432	.....	..	.....
9-1	1,038.90	10,864,078	354,454	.....	33	65,000
10-1	1,038.56	10,346,055	344,868	.....	..	.....
11-1	1,030.46	11,354,346	366,259	.....	..	.....
12-1	1,029.46	11,344,346	378,145	439,106	..	.....
1942:						
1-1	1,025.58	11,821,729	381,346	.....	35	71,000
2-1	1,009.73	12,289,160	396,425	.....	..	.....
3-1	1,007.87	10,771,256	384,688	.....	..	.....
4-1	1,027.12	9,306,407	300,271	.....	..	.....
5-1	1,049.75	6,352,921	211,764	.....	..	.....
6-1	1,031.51	9,825,060	316,937	435,550	45	87,000
7-1	1,038.49	9,305,844	310,195	.....	..	.....
8-1	1,037.71	8,816,771	284,412	.....	..	.....
9-1	1,020.44	11,249,034	362,872	.....	..	.....
10-1	1,020.71	10,738,701	357,957	.....	..	.....
11-1	1,015.22	11,281,024	363,094	.....	..	.....
12-1	1,017.12	10,735,513	357,850	.....	..	.....
1943:						
1-1	1,015.71	.....	.....	.....	45	94,600

pressure is concerned one month's figures cannot be taken as establishing a definite trend. This is due to the fact the conditions under which the tests are taken are not always the same. Consequently, it is much safer to judge the trend over a period of several months.

Bottom-hole pressure, oil production and water production by months are shown in Table 1 from March 1941 to December 1942. The bottom-hole pressure is taken at —3,300 ft. The original water table was —3,320 ft. but it has risen slightly.

It is seen that the lowest point in bottom-hole pressure during the period was in March 1942, when a low of 1,007.87 lb. was reached. Production of oil was restricted during the succeeding months as a means of cutting the water production and the bottom-hole pressure rose until July, held almost steady during August and then dropped in September as a result of the production increase. The responsiveness of the field is demonstrated by the jump of almost 20 lb. in the bottom-hole pressure with reduction in production in April and a jump of 21 lb. in May from the same cause. This reduction was forced by the transportation situation but it demonstrated the contention of the engineers.

Aerating tower and concrete pit on new salt-water-disposal project handling 25,000 bbl. daily

Not included in the above picture is the amount of water being returned to the formation which amounted to approximately 87,000 bbl. during the latter part of the year. Also affecting the picture was the 51,000-bbl. water production shut in as a result of the Railroad Commission's transfer order of February 5, 1942. This order gives the operator 1 bbl. of oil for each 50 bbl. of water shut in with a maximum of 8 bbl. of oil per well to be allotted in this manner. The oil allowable granted under this rule is generally produced from wells not making water. The total withdrawal daily from the reservoir during the period in which the bottom-hole pressure was maintained is remarkably close to the 625,000 bbl. daily which was originally stated to be the maximum rate of production if the greatest ultimate production was to be obtained.

In a paper presented before the A.P.I. in March 1938, Stuart E. Buckley showed what the condition of the East Texas field would be in 1944 if the then present trend of water production was continued. The prediction for June 1942 was 435,000 bbl. of water daily and the well-status report of the Railroad Commission shows that during June 1942 the actual water production was 435,549 bbl. daily.

In 1942 J. K. Baumel, director of production for the Railroad Commission, using past experience and the equations developed by Buckley forecast what the bottom-hole pressure would be in 1946 at various rates of production. The figures are shown in the following table:

B.h.p. in East Texas at Various Rates of Withdrawal

Total withdrawal	B.h.p. 1943	1944	1945	1946
625,000 bbl.	1,040	1,028	1,016	1,004
750,000 bbl.	1,003	960	931	910
810,000 bbl.	992	928	890	865

The accompanying curves show some interesting conclusions drawn by Baumel from conditions and production trends in East Texas. Curve 1 was drawn early in the game and shows what would have happened to the East Texas field (and any water-drive pool) if it had been produced wide open. In 1 month's time the bottom-hole pressure would have dropped from over 1,100 lb. per sq. in. to 801 lb. per sq. in. All of the wells would have ceased to flow and over 200,000 pumping units would have been required.

The second curve shows what would have happened if the oil production had been maintained at 432,000 bbl. per day and no water produced or all water produced returned to the sand. From a b.h.p. of 1,135 lb. in 1939 the reservoir pressure would have dropped to 1,090 lb. in September 1944, during which time approximately 732,000,000

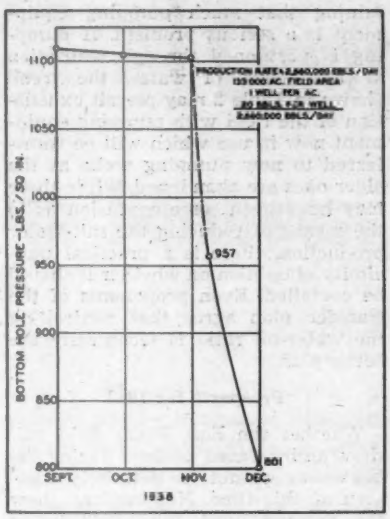


Fig. 1—Effect of excessive rates of water production on a water-drive field such as East Texas. In 1 month pressure in the entire field would have dropped to where all wells would need artificial lift

bbl. of oil would have been withdrawn. The pressure drop per 1,000,000 bbl. oil recovery would have then been 0.62 lb. per sq. in.

The reservoir conditions at different rates of oil withdrawal, plus the water produced with the oil from 1939 to January 1, 1944, are shown in Fig. 3. It will be noted that at 450,000 bbl. oil per day, plus water, a bottom-hole pressure of 740 lb. would be reached in May 1943. Reducing the oil-production rate to 432,000 bbl. per day, plus water, would bring the bottom-hole pressure to 740 lb. in September 1943, and reducing the oil production to 380,000 bbl. would postpone arrival at that point only 3 months longer.

The bubble point in the East Texas field is 755 lb. but actually gas starts coming out of solution at around 1,000 lb., particularly on the east side of the field. This would allow the formation of a gas cap in this area, where the wells would be penalized because of the high gas-oil ratio. (Allowed gas-oil ratio is 500:1 and the solution gas amounts to 365 cu. ft. per bbl. of oil).

TABLE 2

Status of wells—	1940 Apr.	1940 Sept.	1940 Nov.	1941 Apr.	1941 Dec.	1942 June
No. wells in field	.....	.....	.....	25,987	25,934	25,610
Flowing wells making water	949	793	905	759	1,118	961
Pumping wells making water	3,337	3,223	3,496	3,682	4,017	4,070
Pumping wells, no water	2,905	3,007	2,832	3,146	3,118	3,220
Total pumping wells	6,242	6,230	6,328	6,828	7,132	7,290
Air and gas-lift wells with water	331	320	386	458	524	559
Air and gas-lift wells, no water	454	447	463	429	455	439
Total air and gas-lift wells	785	767	849	880	979	998
Total wells making water or on artificial lift	7,975	7,790	8,082	8,474	9,229	9,189
Total wells with water	4,416	4,331	4,787	4,383	5,659	5,530
Daily water withdrawals	179,681	187,811	205,492	387,653	439,106	435,550
Aver. water prod. of wells making water.	38.93	43.31	43.02	100.68	77.59	78.77

Wells should flow at pressures above 800 lb. but here again the theory is a long way from the fact in many cases and actually wells cease to flow, or flow with such difficulty at bottom-hole pressures below 1,000 lb. that they are put on the pump or on gas lift when the reservoir pressure reaches that point.

Pressure and Production

Bottom-hole-pressure maps of the East Texas field naturally show the results of producing rates in various sections. Where the well density is high, the pressure is down and all the wells are pumping. In areas where the withdrawal has been more restrained the pressure is up and the wells flow.

A water map of the field also reflects the production rate and the rate of encroachment. The water is approaching from three sides, west, south, and north, the east and highest side of the field being practically free from water. By maintaining the bottom-hole pressure above 1,000 lb., or even increasing it slightly by controlling the withdrawal, the oil will be flushed out of the sand evenly, the water level will rise gradually, wells will continue to flow until they begin to make water and the pumping period will be comparatively short. There will be only about 3 per cent oil remaining in the formation after such flushing by natural water drive. The recovery of oil will be increased by some 600,000,000 bbl. of oil.

The alternative is to permit the pressure decline to continue, hasten the need for pumping equipment, increase the expense of getting the production, hasten the abandonment of many wells, and decrease the ultimate recovery.

Testimony at the recent hearings of the Railroad Commission on the East Texas field showed that the bulk of the wells are abandoned soon after they begin making 300 bbl. of water daily. After a well gets to making 100 bbl. of water it takes about 10 months for it to get to the point where it can no longer produce its allowable and fall into the marginal class where it can produce less than 20 bbl. per day. After another 18 months the well is abandoned, at which time it is making from 300 to 400 bbl. of water per day and 5.4 bbl. of oil.

Tables 2, 3 and 4, prepared from Railroad Commission records, reveal considerable about water conditions in East Texas.

Status of Field

A glance at Table 2 seems to indicate that the situation hasn't been changing much; in fact it appears to improve in some cases. Actually, the reverse is true as the total number of wells is steadily declining and consequently the wells making water or on artificial lift become an increasing percentage of the total wells in the pool. As a well is abandoned, a pumping well is added to the list of those making water and a flowing well becomes a pumper. The abandonment rate in recent months has been about 1 a day and only six new wells were added during the year.

Table 3 shows the distribution of wells making water as between proratable and marginal wells. Table 4

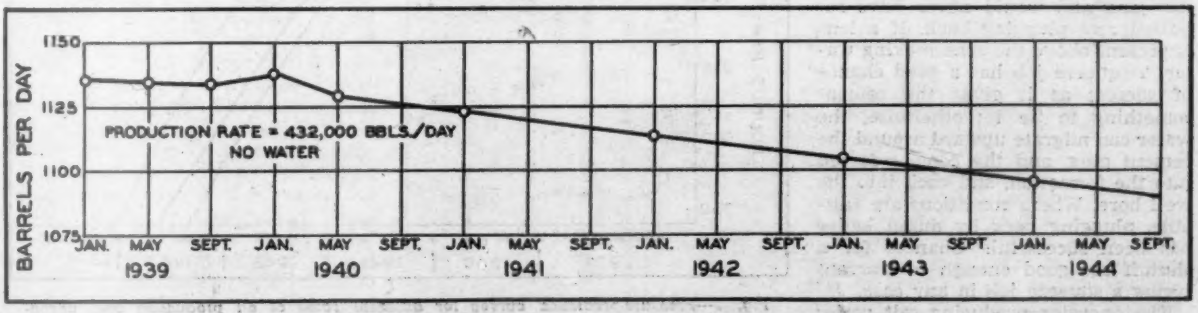


Fig. 2—Bottom-hole pressure decline in East Texas at 432,000 bbl. per day and all water production either held back or returned to the Woodbine sand

TABLE 3—Water Withdrawals

	Water/day	Avg./well
All wells	435,550	78.76
Marginal wells	232,312	230.93
Prorated wells	203,237	44.92

TABLE 4—Wells by Volume Produced

Water prod. From	To	No. wells	Amt. water produced	Oil produced
100	150	265	38,572	5,362.18
150	200	203	35,396	3,223.71
200	250	201	44,263	3,111.01
250	300	138	37,557	1,968.34
300	350	120	33,666	1,732.07
350	400	98	36,574	1,383.11
400 and up		216	116,197	3,159.30

TABLE 5—Results of Plug-Back Work

	1940	1941		1942	
	4-1 to 9-15	9-15 to 12-1	12-1 to 4-15	4-15 to 12-1	12-1 to 6-15
100 per cent shutoff	30	6	23	58	19
Partial shutoff	31	10	16	31	27
No help	3	0	11	15	15

classifies the water wells (those making over 100 bbl. per day) according to the amount of water produced. It also shows the amount of oil produced with the water. The 1,241 wells tabulated comprise 4.8 per cent of the total wells in the field, the figures being compiled when there were approximately 25,800 wells in the pool. The total water produced by these wells is approximately 79.7 per cent of the total daily withdrawal from the Woodbine sand while the total oil allowable represents 3.9 per cent of the field allowable. Wells making more than 400 bbl. of water per day represent 0.84 per cent of the wells in the field, the 116,197 bbl. of water which they yield represents 26.7 per cent of the total water production in the field and 3,159.88 bbl. of oil is 0.624 per cent of the field's total allowable.

Plug-back work to reduce the amount of water produced has not been universally successful, as Table 5 shows. Occasion for the remedial work in some cases can be blamed on the practices prevalent 10 years ago, particularly the need for penetrating practically all of the producing section to assure a high potential. Some of the wells making water, on which remedial jobs had to be performed, could have obtained their allowable by penetrating the few top feet of the sand and would never have required any plugging back. If a lens is present above the zone making water, a squeeze job has a good chance of success as it gives the cement something to tie to; otherwise, the water can migrate upward around the cement plug, and the cement forced into the formation, and back into the well bore. Where conditions are suitable, plugging back by dump bailer has been successful. Chances for a shutoff are good enough to warrant trying a squeeze job in any case.

The operator producing salt water has a choice of attempting to gain a shutoff, of making arrangements for the reinjection of the water at the same time applying for an oil bonus for the water returned to the formation, of shutting in the water producer and asking for the 1 bbl. of oil for each 50 bbl. water shut in, or of curtailing the water production to 10 times the allowable per day getting the oil that is produced with that amount of water.

The 1 bbl. of oil for each 50 bbl. of water returned defrays the expense of injecting the water. If the bonus oil can be produced from the operator's own properties, he can transfer the allowable to these. Or he can purchase this oil from another producer for around $0.93 per barrel.

If an operator has two wells on a lease, both making water, he can convert one to an injection well and take his bonus oil from the other well or another well which does not make any water. The only limit to this arrangement is the amount of water which can be handled economically and the proration restrictions on per-well production.

One fact forcing many operators to favor salt-water-production restriction and/or reinjection is the scarcity of pumping equipment. Without some means of maintaining the reservoir pressure at its present level, 1,600 wells will be converted from flowing wells to pumpers during 1943. Obtaining that much pumping equipment is a serious problem. If pumping is postponed through restriction or reinjection of water, the trend shown in Table 2 may permit exhaustion of the field with pumping equipment now in use which will be transferred to new pumping wells as the older ones are abandoned. While there may have been some confusion as to the means of reducing the salt-water production, there is a practical unanimity of opinion on whether it should be curtailed. Even proponents of the transfer plan agree that controlling the water-oil ratio is technically the better plan.

Prospects for 1943

Whether the East Texas field will show an increased demand during the next year cannot be definitely foreseen at this time. Nominations show the demand until June 1943 to be 401,593 bbl., which is about 45,000 bbl. daily over the present production rate. At the present rate of water production, this would mean a withdrawal of 955,000 bbl. daily and one has only to look at Fig. 3 to see what the results will be. Present plans call for the injection of 200,000 bbl. daily of salt water by February 1 and a gradual stepping up of the program. However, at the above production rate and putting the injection rate to 275,000 bbl. per day would still leave the volumetric withdrawal above the 625,000-bbl. maximum.

The future of the field is inextricably tied up with the return of the salt water to the Woodbine sand. Progress in this direction will be discussed in a succeeding installment.

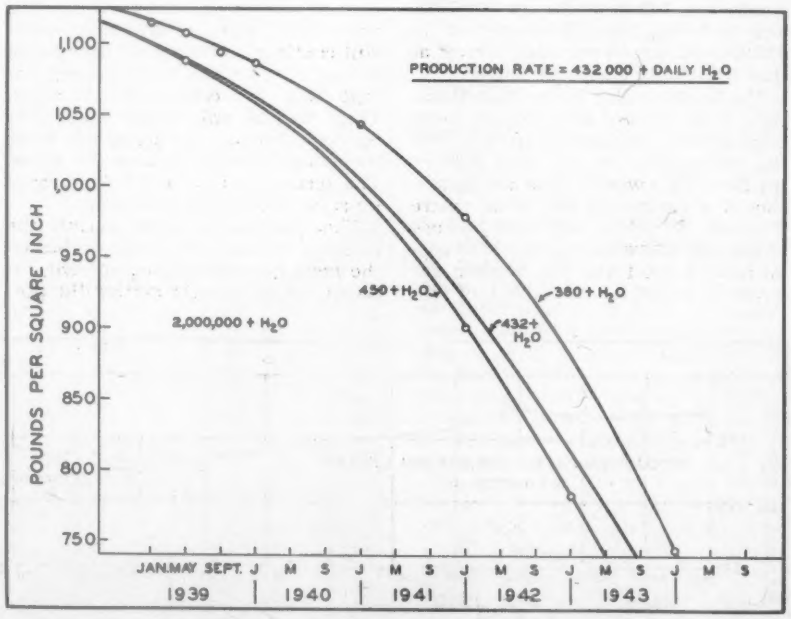


Fig. 3—Pressure-prediction curves for different rates of oil production and uncontrolled water withdrawal based on history of East Texas field and projected to pressure of 740 lb. per sq. in. Pressure curves by J. K. Baumel, Texas Railroad Commission

Completion Practices

In Northwest Wilmington Area, California

by W. R. Cabeen and A. L. Hunter *

This is the second of a series of articles on the Northwest Wilmington-Torrance area. This is practically the only area of any size yet to be developed in the Los Angeles Basin and presents many problems both in development and in the completion and handling of wells. The first article, dealing with the geology of the area, was published in the January 14 issue of The Oil and Gas Journal, pages 70 to 74. The last article, dealing with expected recovery, will appear in an early issue.

SINCE nearly all of the operators in the extension of Northwest Wilmington are smaller independents, the completion technology in this area has been variable. From their experience in engineering many of the wells in this area, the writers have worked out certain practices which they believe advisable for best results. Production in the field has borne out the wisdom of these practices.

The common practice in Northwest Wilmington has been to spud in with a 20-in. bit and set 80-100 ft. of 16-in. conductor pipe. Thereafter a 12¼-in. hole is drilled to the anticipated top of the Ranger zone, after which an electric log is run for the selection of the F_1 marker for the casing-shoe point. The hole is then reduced to 7⅞ in. through the oil zone and usually carried down about 685 ft. to and including a varied penetration of 40 ft. in the "J" sand. (Some of the wells down plunge as far west as Figueroa and beyond should not penetrate into it but should stay above a shell marker which is 85 ft. stratigraphically above the J point.) A 7-in. or 8⅝-in. water string is then run to the F_1 point where it is cemented. Some wells set about 100 ft. above this and take in approximately 26 ft. (total sand interval thickness) of oil sand to be found below the main Tar zone sand body and above the F_1 point. The main Tar sand is wet in all except the structurally highest portion of the southeastern sector. When cementing the casing, enough cement is usually put away (about 600 sacks) to overlap the base of the poorly consolidated fresh-water reservoir beds of the upper Pico (which point usually occurs at approximately 1,700 ft.) and thus protect surface waters. (This method of protecting surface waters in this district has only recently been permitted. Previous to this, cementing through a collar at approximately 1,000 ft. was required. Before use of the cement collar which could be opened for putting away cement and then closed, operators were required to shoot holes to put away the cement for this surface shutoff and then test its effectiveness by reperforating. The old method of using a surface string to protect surface waters has not been required since the summer of 1941.) The Division of Oil and Gas requires a shoe test of the water string, to be witnessed and approved by their engineers. After making the water shutoff test, required by the state Division of Oil and Gas, the cement below the shoe is drilled out. The hole in many cases is then underreamed. The next step is to run prepacked gravel liner to bottom, blanking off the shaly portions of the section. The electric log run on the interval below the F_1 point (shoe point) is used to determine the intervals to be produced and those to be blanked in the combination liner. There are three sections that are usually blanked: (1) That shaly interval approximately 50 ft. in thickness occurring between the two main sandy phases of the Ranger zone; (2) the interval between Ranger (Pliocene) and Terminal (Miocene) varying in thickness from 165 to 190 ft., according to the particular location, its structural position, etc.; and (3) the J shale which is approximately 90 ft. thick. (Fig. 1.)

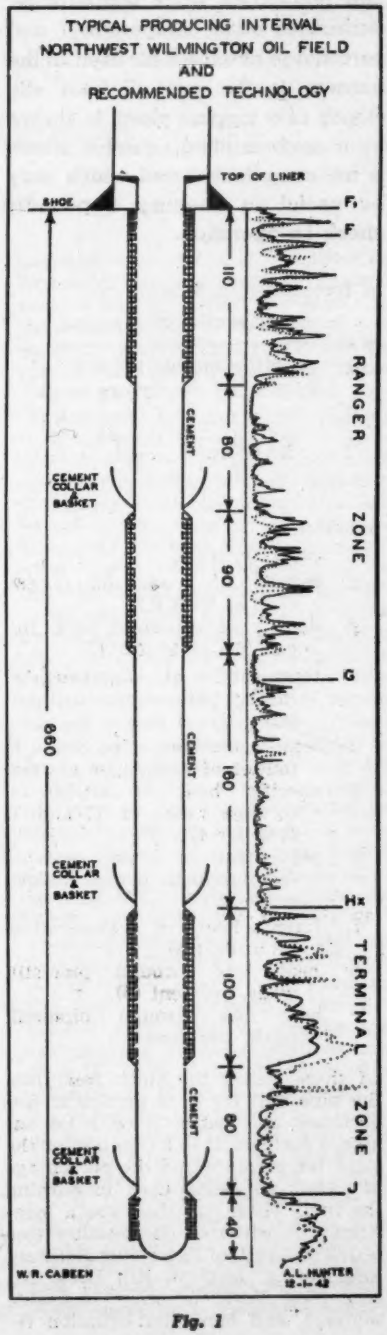


Fig. 1

Blank Liner

Cementing the blank liner sections in Northwest Wilmington has proven to be the wisest procedure. The advantages of cementing the blank intervals are (1) to assist in the prevention of liner collapse due to production of sand from below these blanked shale intervals and the resultant removal of their support in the hole

(Continued on Page 181)

THERMAL EFFICIENCY In Topping Plants

by W. L. Nelson

Practical Refining Series — 2

The relation of stack temperature, exchanger outlet temperature, and percentage of excess air used at the burners to the over-all heat efficiency of a topping plant, is shown by a mathematical equation which is not complicated and which may be useful in keeping a periodic check on operation.

ALTHOUGH the thermal efficiency of a topping plant is primarily a function of only three common variables, the relative importance of these three factors as related to fuel consumption, is not exactly evident. The fuel consumption or thermal efficiency is dependent mainly on the temperature attained in the exchangers, the temperature at which the flue gases enter the stack, and the per cent of excess air used at the still burners.

These three variables have been related by means of an efficiency equation, and by equations which show the amount of heat required per hour. When applied to a particular plant the equations are not complicated and they can be used by superintendents, managers, etc., in checking the daily operation of the plant. The fact that these equations focus the attention of plant operators on the importance of stack temperatures, exchanger temperatures and the amount of excess air used, is probably their most important usefulness.

For a 10,000-bbl. plant operating on Mid-Continent crude oil, and when operating at a vaporizer temperature of 600° F. for the separation of 55 per cent of overhead products, the heat efficiency of the operation may be expressed as follows:

$$E = \frac{121{,}000 - (0.0894q + 10.45)t^{1.227}}{5725 - 8.55\,T_2} \quad (7)$$

and the heat required in the B.t.u. per hour is:

$$H = \frac{57{,}240{,}000 - 85{,}500\,T_2}{0.95 - (0.00007q + 0.0082)\frac{t^{1.227}}{100}} \quad (5)$$

The following tabulation shows the efficiencies of this plant when operating at various stack and exchanger temperatures (with 20 per cent of excess air being used at all conditions).

Exchanger Temp. °F.	Stack Temp. °F.	Efficiency with 20% excess air	Efficiency with 100% excess air
200	400	26.5	25.4
300	550	32.1	30.2
400	700	41.2	37.8
500	800	62.8	56.6
560	850	95.0	84.5

Derivation of Equations

An equation of the heat required to operate a simple topping plant may be formulated as follows:

$$\text{Heat} = \frac{\text{to heat oil} + \text{to vaporize}}{\text{efficiency of pipe still}} \quad (1)$$

in which:

- C capacity, b.p.d.
- g density of crude oil, lb./gal. (7.08 or 35 A.P.I.)
- g_p density of vaporized part, lb./gal. (6.5 or 50 A.P.I.)
- T_1 temperature at vaporizer, °F. (nearly same as pipe-still outlet)
- T_2 temperature into pipe still, °F. (outlet of exchanger system)
- h specific heat of crude oil through range of T_1 and T_2 (0.69 for 470° F.)
- p percentage of crude reported (all products except topped crude oil)
- L latent heat of vaporization, B.t.u./lb. (95)
- w heat loss through pipe-still walls, per cent (5)
- e heat loss through pipe-still stack, per cent

Of these items, the stack loss from the pipe still (e) is of particular importance and hence it will be analyzed further. It is a function of the stack temperature and the percentage of excess air being used in burning the fuel. These variables are a logarithmic function of one another (see p. 182 of 2d ed. of Petroleum Refinery Engineering, McGraw-Hill Book Co., Inc., New York, or other reputable sources), and hence an equation relating them is somewhat complicated. In a general way these variables may be related by an equation such as:

$$e = (0.00007\,q + 0.0082)t^{1.227} \quad (3)$$

in which:

- q amount excess air used, per cent
- t stack temperature, °F.

Many of the variables or symbols shown in the above equations are nearly constant except when some freak crude oil is being processed. These nearly constant variables have been assigned reasonable values in the above tabulations as indicated by the numbers in parenthesis. When these values are inserted, the equation is greatly simplified.

$$\text{Heat required} = \frac{8.55\,C(T_1 - T_2) + 10.8\,Cp}{0.95 - (0.00007\,q + 0.0082)\frac{t^{1.227}}{100}} \quad (4)$$

In a particular plant which operates continuously on the same crude oil and for nearly the same products each day, the equation becomes even more simple. For example, a plant which processes 10,000 b.p.d. for 55 per cent of products by heating to a vaporizer temperature of 600° F.—

$$\text{B.t.u./hr.} = \frac{C \times \frac{42}{24} \times g\,(T_1 - T_2)h + C \times \frac{42}{24} \times \frac{p}{100} \times g_p \times L}{1 - \frac{w}{100} - \frac{e}{100}} \quad (2)$$

$$\text{Heat required} = \frac{57{,}240{,}000 - 85{,}500\,T_2}{0.95 - (0.00007\,q + 0.0082)\frac{t^{1.227}}{100}} \quad (5)$$

Plant Efficiency

The efficiency of the operation can be evaluated by comparing the actual operation with a similar operation in which the exchanger temperature is high, the stack temperature is low, and only a small amount of excess air is used in the pipe still. It is not economical to attain a temperature in the exchanger system higher than about 40° F. below the temperature of the hottest stock produced in the plant, and hence a model plant or operation would operate at an exchanger outlet temperature of (T_1—40) (p. 657, Petroleum Refinery Engineering, 2d ed., McGraw Hill Book Co., New York). The most economical stack temperature (p. 660 of above reference) is about 290° F. higher than the exchanger outlet temperature, or about (T_1+250). Finally, the minimum amount of excess air that can be obtained with most burners is about 20 per cent. A topping plant operating under these conditions would use the least amount of heat

$$\text{Eff.} = 100\,\frac{\text{Legitimate useful heat expended}}{\text{Actual heat expended}}$$

$$= 100\,\frac{8.55C(T_1-T_3+40)+10.8C_p}{8.55C(T_1-T_2)+10.8C_p}\cdot\frac{0.95-(.00007q+.0082)\frac{t^{1.327}}{100}}{0.95-(.00007\times 20+.0082)\frac{(T_1+250)^{1.327}}{100}}$$

$$= \frac{34{,}200+1080p}{8.55(T_1-T_2)+10.8p}\cdot\frac{95-(.00007q+.0082)t^{1.327}}{95-.0096(T_1+250)^{1.327}} \qquad (6)$$

that can be used without increasing the cost of the plant disproportionately—and the heat consumed in such a plant can be considered as a legitimate expenditure of useful heat.

Again, the efficiency equation for a particular plant is much less complicated. Considering the same 10,000-bbl. plant as that used for Equation 5 the efficiency equation is:

$$\text{Eff.} = \frac{121{,}000-(0.0894\,q+10.45)t^{1.327}}{5725-8.55\,T_2} \qquad (7)$$

Completion Practices in Northwest Wilmington Area, California

(Continued from Page 179)

which, together with disintegration of the overlying shale by absorption of water, causes these shale intervals to move in against the liner and collapse it, which usually necessitates the expense of a redrill job. The source of water in the Ranger-upper Terminal section in Northwest Wilmington is found in thin gray sand streaks in the predominately shale intervals (2) and (3) mentioned above. Source of the water in these intervals has been found by core data and water witch determinations and varies stratigraphically from one fault block to another depending upon factors governing the accumulation of fluid in each fault block. Therefore, it follows that the technology to be applied will vary according to the fault block and the position of the well under consideration in that fault block. A surprising number of liners in wells in Northwest Wilmington have collapsed in the last few months. In all of these wells the blank sections had not been given support by cementing.

Cementing Blank Sections

2. By cementing these blank sections the above-mentioned wet streaks occurring in these shaly intervals are cemented off, giving the well a much lower cut. This also stops the disintegration of the shale by the water behind the blank which aids in and leads to collapsing the liner.

3. If at any time it is necessary to plug the well back, it is only necessary to put a bridge plug in the cemented blank to make an effective shutoff. In Northwest Wilmington this is especially important as the J sand, in the lower portion of the hole, is in certain areas the most likely member to go wet first necessitating the plugging of the bottom of the hole. (Where an easy and effective method of plugging back can be effected it often makes it worth while to include a certain portion of a thick sand like the J and produce it for a period even though it may become wet before the rest of the zone. Much oil may be recovered not otherwise possible.)

Cementing of these blank sections requires little expense and time as compared to the benefits and insurance derived. The normal procedure requires a series cementing collar and basket at the base of each blanked section as shown in the diagrammatic plan (Fig. 1). The cementing procedure is carried out with the use of a series cementing tool run on tubing or drill pipe. The tool is lowered to the base of the lowermost blank and seated in its respective collar. A typical procedure is to put away enough cement behind the blank to fill about three-fourths of the annular space behind the blank. This procedure is normally followed to restrict contamination of the perforations above the blanked section in the event of channeling. After putting away the cement the tool is raised to the base of the perforations immediately above the blank and circulation is reversed to wash out any excess cement that may have accumulated as a result of channeling behind the perforated interval. The tool is then raised to the next blanked section above, and the process repeated. Tubing is then removed from the hole. If the procedure of cementing the blank sections is not followed, running a basket at the base of the blanked intervals will often assist in effecting a formation shutoff the wet streaks behind the blank above the basket. Furthermore, by the use of baskets at the base of the blank section a favorable means is provided by which corrective measures may be resorted to in the future. After cementing operations are concluded the tubing is run into the hole with washer and then the mud column is displaced with water, following which the perforations are thoroughly washed. After washing, the well is put on production in a manner suitable to conditions of structural location and conducive to best production practices.

Recently the Division of Oil and Gas has permitted the use of a combination water string and liner, in which case the liner is run with the casing, and the water shut off over the producing formation is made through a whirler collar with solid-bottom baffle and basket. Perforating immediately above the collar to test the effectiveness of the shutoff is presently required by the Division of Oil and Gas. After the shutoff test is made and approved, the solid-bottom baffle is drilled out and the hole cleaned out to bottom in preparation for the series cementing operations on the blanked intervals as previously described.

Gravel packing has been used in the largest majority of cases in this area to overcome sand trouble encountered principally in the Ranger zone. Close spacing and competitive withdrawal rates have made this practice necessary. A number of operators in the main townlot portion of the field have used conventional liners, without success. Production of excessive amounts of sand and in many cases final collapse of the liner necessitated redrilling, after which gravel-pack liners were installed. In these cases it must be pointed out that proper support was not given to the shale intervals as discussed above, and the wells were produced in competition with closely spaced offsets. Some of the wells in the north flank of Wilmington which are more widely spaced, low-pressure flank wells have successfully used the conventional liner. It is believed by many that gravel packing, due to silting up of the bore of the hole and the gravel pack creates an artificial decline to the wells. Some production men contend that a conventional liner may be successfully used in a low-pressure area, provided that a suitable back pressure is maintained against the formation. Sand control by means of back pressure does not permit as high a daily yield as by control through gravel packing, however, it is maintained that in many cases that (excluding competitive draining from close townlot offsets) over a period of time the slower decline without gravel pack yields more oil in the long run.

In the several sections of Northwest Wilmington considered the most promising for development of reserves it is highly important that all factors be considered in effecting the proper completion technology best suited for the particular set of conditions involved.

Improved Penn State Smokemeter

*by P. H. Schweitzer**

The function of the smokemeter in detecting in the exhaust of a diesel engine indications of improper combustion is discussed in this article. Recent improvements in the device have increased the accuracy of observations.

ORIGINALLY developed in 1938†, the Penn State smokemeter has been widely adopted since then for measuring the exhaust smoke of diesel engines and also in a modified form for oil burners.

Its principle of operation is shown in Fig. 1. It consists of a tube of about 1¾ in. i.d., and 18 in. long, with glass windows at each end. A lamp is mounted at one end and a lightmeter on the other end. The exhaust is admitted in the center through a tubing that connects the smokemeter tube to the exhaust pipe. The smokemeter tube is open to the atmosphere through a row of small holes at both ends, 2 in. from the windows. An adjustable shutter was interposed between the lamp and the window by which the lightmeter reading for clear could be set to a standard value. This is necessary to take care of variations in light intensity and soiled windows.

*Professor of Engineering Research, Pennsylvania State College.

†P. H. Schweitzer, Smokemeter of Simple Design Tests Diesel Combustion, Automotive Industries, August 20, 1938, p. 238.

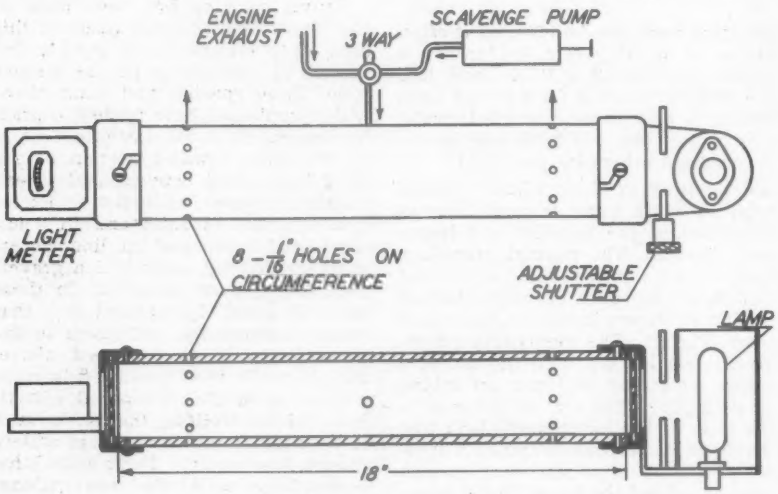


Fig. 1—Diagram showing principle of operation of smokemeter

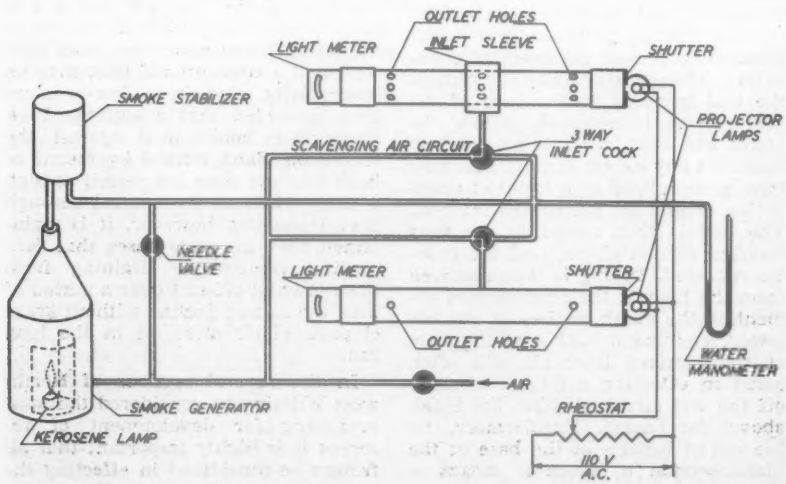


Fig. 2—Setup for comparative tests of smokemeter tubes to determine the effect of the number and size of inlet and outlet holes with and without an inlet sleeve

The smoke density was measured in the following way: The tube was first scavenged with air (shop air was used), and the lightmeter hand was brought to register 50 foot-candles on the General Electric lightmeter, by adjusting the shutter. Then by the three-way cock the smokemeter was brought in connection with the exhaust, and when the lightmeter reached its new equilibrium in about 30 seconds, the foot-candle reading was recorded. If the reading was, say. 30 foot-candles, the loss in light intensity is 20/50 = 40 per cent and the corresponding smoke density is 40 per cent. If the instrument registered no loss in light intensity when switching from free air to engine exhaust, the smoke density is, of course, zero.

The feature of this smokemeter is that it samples the smoke, instead of measuring the smoke density of the full stream. The smoke fills the smokemeter tube under atmospheric pressure and is almost at rest. Therefore, the smoke determination does not depend on the exhaust gas velocity or quantity. It does not depend on the light source intensity, lightmeter sensitivity and window deposits, as these factors are neutralized by the shutter adjustment. The only factor that enters is the length of the smokemeter tube, for which a standard length of 18 in. was proposed. If the lightmeter hand goes back from 50 to X, then the smoke density is 100 (1 — X/50) per cent.

Since its adoption, considerable work has been done on this smokemeter by engine and oil-company laboratories with a view of improving its accuracy and convenience. These improvements will be briefly described.

Rheostat

As a means of adjusting the incident light intensity, the shutter was replaced by a rheostat. It was first argued that a rheostat which reduces the current voltage not only reduces the intensity of the light, but changes the color. The photocell may be more sensitive to one portion of the spectrum than to others. In this way an error might be introduced in smoke testing.

The point was decided by comparative tests in our laboratory. Smoke

was simulated by layers of tracing paper, and the soiling of the windows by additional layers of tracing paper. The "per cent smoke" was then determined with clear and soiled windows by both the shutter and rheostat arrangement. The result of the test was that the rheostat is fully equivalent to the shutter and its operation more convenient.

The smokemeter without sleeves gave the correct reading in a shorter time than the one with an inlet sleeve; that is possibly due to the additional volume inside the sleeve.

Effect of Smokemeter Length and Location

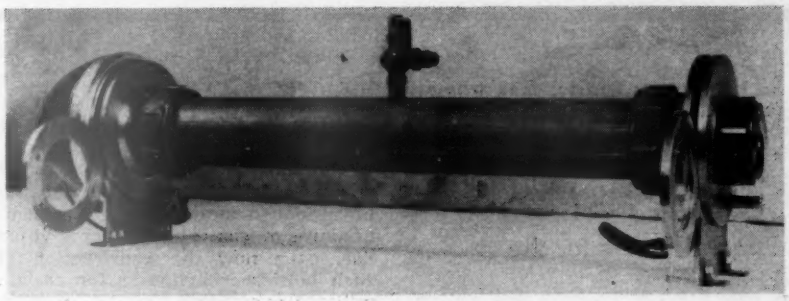
Engine exhaust smoke was determined by three smokemeter tube lengths, 18-in., 12-in., and 8-in., and two locations for the connecting tube, 8 in. and 102 in. from the cylinder head. The smoke density reading was lower with a shorter smokemeter tube, but the location of the exhaust connection has no appreciable effect.

Other Improvements

Our first smokemeter was provided with detachable windows for convenient removal of smoke and fog deposits. The Naval Experiment Station of Annapolis mounted a heater coil on the window next to the lightmeter to prevent water condensation on it. On the light source end the lamp is sufficient to keep the window free of moisture.

To facilitate the cleaning of the windows the Esso laboratory devised the hinged tilting windows shown in Fig. 3. At the same time it replaced the high-wattage projection lamp

(Continued on Page 185)



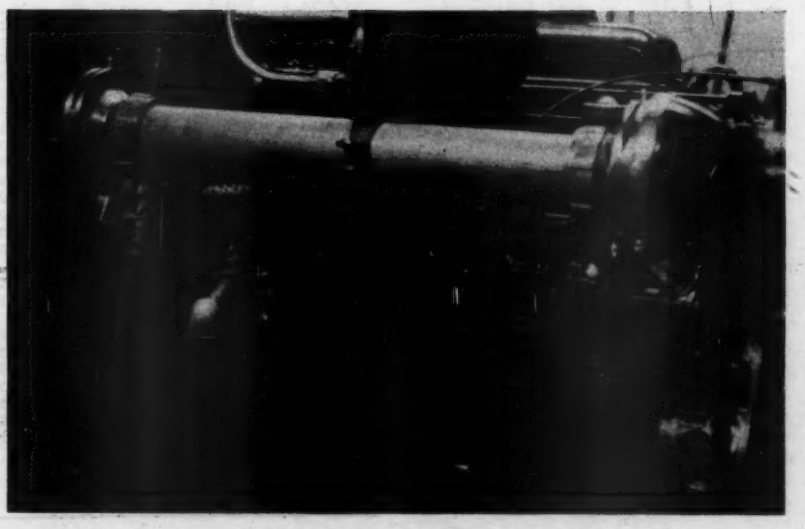


Fig. 3 (above)—Improved smokemeter. Control box separate. Fig. 4 (right)—Control box of smokemeter. Note dial calibration from 100 to 0, to read per cent smoke density directly. Fig. 5 (right, bottom)—Improved smokemeter mounted on engine exhaust pipe

Sleeves and Holes

In the Penn State smokemeter the exhaust gases enter through one hole in the center and exit through holes at each end of the smokemeter pipe. Sleeves have been proposed around the inlet and exit holes to distribute the smoke. Since a more homogeneous distribution of smoke affecting the lightmeter readings could be claimed, comparative tests were undertaken with a smokemeter tube having sleeves and one without sleeves. The number and size of inlet and exit holes were also varied. The report on these tests is as follows:

Two complete smokemeters were tested, their smoke and light circuits being put in parallel and readings were taken simultaneously. The setup is shown in Fig. 2.

As it was not convenient to operate on an engine, the smoke was generated by a small kerosene lamp burning in a closed tank. The air was supplied under a small pressure and the heavy smoke, after going through a stabilizing tank and being mixed with compressed air in a proportion which could be varied by opening more or less a needle valve, was conducted into both smokemeters. A water manometer gave approximately the pressure of the entering smoke (0.1 in. to 1 in. water). The readings were fairly steady and different densities of smoke easily obtained. The results show that the smokemeter reading is practically the same with and without sleeves and is not affected by the number and size of openings within the investigated ranges.

PROGRESS IN METALS

by W. L. Nelson

Selection of Steels

WHAT Steel Shall I Use? By Gordon T. Williams. Published by the American Society for Metals, Cleveland, Ohio, 1941. Cloth, 6¼ by 9¼ in. 209 pp. Price $3.50.

The confusion that often exists in the minds of engineers, maintenance men and purchasing agents, concerning what steel should be used for each of a multitude of services, can be cleared in some degree by this book. This is of particular significance today because of the large degree of substitution (of one steel for another) that is demanded by our war effort. The forceful statements of sales agents and technical writers on the virtues of one steel as compared with others can be tempered by a perusal of this little volume which will point out the many other factors than those of theory, composition, etc., which enter into the selection of a steel. The forceful review of this book in Metals & Alloys of August 1942, by the eminent authority H. W. Gillett, follows:

"The book doesn't answer the question, for the answer is, 'It all depends.' Indeed, it states, 'Selection must be made on factors, such as hardenability, price and availability and not because this steel can do something no other can do because it contains 2 per cent instead of 1 per cent of a certain alloying element or has a mysterious name.' Further, 'The majority of the problems encountered will be mechanical.'

"With these principles in mind, the bulk of the book relates to such things as fatigue failures, notch-toughness, wear, limittations of existing heat-treating equipment, limitations of case-hardened steels, machinability, and the like. The aim is to develop a sound, realistic point of view.

"Because it does this in simple language, e.g., 'Smart engineering is to try the cheap way first,' it is one of the first books the metallurgical engineer should read in connection with conservation and substitution problems. It could be particularly advantageous if Donald Nelson could make everyone concerned with drawing up Army and Navy steel specifications read it."

It must be pointed out that this book is not written for men who are unfamiliar with metals. It assumes that the reader has a general knowledge of metals and of metallurgical terms.

Special Steels for the Emergency

THE acute need of nickel, chromium, etc., for our war equipment and industries necessitates the fullest use of substitute steels, or steels which contain a minimum of the scarce elements. The alloy element silicon can be had with little difficulty and our abundant source of molybdenum makes the use of these elements the logical ones for emergency steels. Tabulated below are the National Emergency Alloy Steels known as the N.E.-8000 Series—manganese molybdenum, and low chromium nicked molybdenum steels—which were developed in an attempt to alleviate our shortages of strategic alloy elements. Also are shown the regular A.I.S.I. steels which contain no chromium or nickel. These steels will also be useful particularly for the less severe services. These steels are available from most steel manufacturers.

National Emergency Alloy Steels

Description	C	Mn	Mo	Ni	Cr	Si
NE 8024	0.22/0.28	1.00/1.30	0.10/0.20			0.20/0.35
NE 8124	0.22/0.28	1.30/1.60	0.25/0.35			0.20/0.35
NE 8233	0.30/0.36	1.30/1.60	0.10/0.20			0.20/0.35
NE 8245	0.42/0.49	1.30/1.60	0.10/0.20			0.20/0.35
NE 8339	0.35/0.42	1.30/1.60	0.20/0.30			0.20/0.35
NE 8442	0.38/0.45	1.30/1.60	0.30/0.40			0.20/0.35
NE 8447	0.43/0.50	1.30/1.60	0.30/0.40			0.20/0.35
NE 8547	0.43/0.50	1.30/1.60	0.40/0.60			0.20/0.35
NE 8620	0.18/0.23	0.70/0.95	0.15/0.25	0.40/0.60	0.40/0.60	0.20/0.35
NE 8630	0.27/0.33	0.70/0.95	0.15/0.25	0.40/0.60	0.40/0.60	0.20/0.35
NE 8724	0.22/0.28	0.70/0.95	0.20/0.30	0.40/0.60	0.40/0.60	0.20/0.35
NE 8739	0.35/0.42	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60	0.20/0.35
NE 8744	0.40/0.47	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60	0.20/0.35
NE 8749	0.45/0.52	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60	0.20/0.35
NE 8817	0.15/0.20	0.70/0.95	0.30/0.40	0.40/0.60	0.40/0.60	0.20/0.35
NE 8949	0.45/0.52	1.00/1.30	0.30/0.40	0.40/0.60	0.40/0.60	0.20/0.35
A 4023	0.20/0.25	0.70/0.90	0.20/0.30			0.20/0.35
A 4024	0.20/0.25	0.70/0.90	0.20/0.30			0.20/0.35
A 4027	0.25/0.30	0.70/0.90	0.20/0.30			0.20/0.35
A 4028	0.25/0.30	0.70/0.90	0.20/0.30			0.20/0.35
A 4032	0.30/0.35	0.70/0.90	0.20/0.30			0.20/0.35
A 4037	0.35/0.40	0.75/1.00	0.20/0.30			0.20/0.35
A 4042	0.40/0.45	0.75/1.00	0.20/0.30			0.20/0.35
A 4047	0.45/0.50	0.75/1.00	0.20/0.30			0.20/0.35
A 4063	0.60/0.67	0.75/1.00	0.20/0.30			0.20/0.35
A 4068	0.64/0.72	0.75/1.00	0.20/0.30			0.20/0.35
A 9255	0.50/0.60	0.70/0.90				1.80/2.20
A 9260	0.55/0.65	0.70/0.90				1.80/2.20

Light Metal Gas Bottles (Cylinders)

ALTHOUGH for some months or years, the United States will not have enough aluminum for the manufacture of gas cylinders for civilian use, even now the construction of such bottles or cylinders for certain military operations may be justified. Certainly upon return to peaceful pursuits, the logic of decreasing the weight of gas bottles (air, oxygen, acetylene, and liquefied petroleum gases) is obvious when we consider the lugging and handling that these bottles undergo. The following abstract taken from Metals & Alloys of July 1942, indicates what the Swiss (and probably Germans) are doing in this direction.

Abstract—by T. Wyss, Schweiz. Arch. angew. Wiss. Tech., Vol. 7, Nov. 1941, pages 318-325.

Light metals are increasingly used in Switzerland for gas tanks, mainly for 1, 2 and 3.3-l. tanks for oxygen, compressed air, acetylene, and other compressed gases.

The following tests are compulsory On test specimens of the container material-tensile test, bend test, impact test (all three with pieces cut out longitudinally and peripherically).

Brinell hardness, fatigue tests, macro and micrographic analyses, internal stresses, chemical composition, and X-ray examination of the oxide film; on the containers working pressure, test pressure, appearance of elastic limit at bottom and sides, static tensile test, fatigue test.

The specifications are: Brinell hardness—average 105, minimum 95; tensile strength (longitudinal)—average 54,000 lb. per sq. in., minimum 48,500 lb. per sq. in.; yield point (0.2 per cent elongation)—average 34,000, minimum 31,600 lb. per sq. in.; elongation (longitudinal)—average 16 per cent, minimum 14.4 per cent; number of bends—average 35, minimum 28; impact strength (notched bar longitudinal)—average 3, minimum 2 mkg./cm.²

	Composition						
Material—	Si	Cu	Mn	Mg	Fe	Ti	Al
Lautal	1.6	4.5	0.5	..	0.4	...	bal.
Antikorodal..	1.0	..	0.7	0.7	0.3	...	bal.
Avional D ..	0.3	3.0	0.5	0.5	0.3	...	bal.
Avional DTi	0.25	3.8	0.5	0.5	0.3	0.16	bal.

The containers with a working pressure of 21,300 lb. per sq. in. have a test pressure of 32,000 lb. per sq. in. and shall have a minimum elastic limit of 42,700 lb. per sq. in., a minimum tensile strength of 61,000 lb. per sq. in. and an average tensile strength of 67,500 lb. per sq. in.

Tests have been made with four materials, as tabulated above. Of these four, "Lautal" is a German product, the other three are Swiss alloys brought out successively and representing improvements over Lautal and the respective older types. The best method of fabrication is deep drawing.

The added titanium not only improved mechanical properties but the structure also. Corrosion resistance could be improved by anodic oxidation. Tanks made from Avional are especially recommended for the larger-capacity bottles.

Use Cast Iron in Place of Steel

IN the face of stern necessity of conserving every pound of steel, the use of high-strength gray cast iron offers many possibilities. The following abstract indicates few applications to the petroleum industry but it does indicate what has been done in other industries:

Abstract: J. Blakiston, Replacing Steel With Cast Iron, Inst. of British Foundryman Adv. Copy No. 752, June 20, 1942. Taken from Metals & Alloys, Sept. 1942.

Stress is laid on what advantage engineers have so far taken of revolutionary developments in the manufacture and engineering properties of cast iron. The first part of the paper features instances of replacement of steel castings by high-test iron.

The second portion of the paper describes how the small iron-founder, in many cases still untouched by these developments, can proceed to make high-test iron. The third section discusses the latest trends and probable future developments in the high-test iron field.

High-speed diesel and gasoline engines are now fitted with cast iron crankshafts as a matter of course. Before Ford fitted his misnamed cast-iron (actually hypereutectoid cast steel) crankshafts to his standard car models, many American manufacturers had been using high-strength gray iron crankshafts for refrigerators and similar machinery, but kept the matter secret because of public prejudice against cast iron.

Use in Spindles

High-test iron is being extensively used for spindles; a 45-ft. by 15-ft. solid boring bar made of cast iron, which replaced a costly steel forging is illustrated. It has been found possible with spindles of Meehanite, for example, to operate lathes, milling machines, etc., at a much higher speed, utilizing the remarkable properties of carbide cutting tools to their fullest advantage on account of the vibration-absorption properties of cast iron.

A horizontal boring machine main spindle neck bearing made from a typical good grade of gray iron is also shown. This revolves in a bronze bushing, and the bearing qualities of the combination are excellent. Apart from its tensile properties this iron has excellent machinability, taking a fine finish even when extended to fine screw cutting on heavy sections.

In one type of horizontal boring machine, the main traverse rack and column-rotating rack of which, formerly made in 0.4 per cent carbon steel, were replaced by high-tensile gray iron having a tensile strength of 55,000 lb. per sq. in. In another case—a heavy high-speed planing machine—the main table rack and tool clapper boxes, formerly of steel, are now made of gray iron.

In the case of the replacement of steel gearing the improvements in gear-cutting methods have greatly helped, and the "quietness" in operation of high-test cast-iron gears is now an accepted fact. Among the other substitutions mentioned are hydraulic-pump bodies, connecting rods and cross heads; and a 250-ton extrusion press body.

It is imperative that the general metal thickness of the castings be constant, and only one casting section can be run in a foundry without changing the metal analysis. Cooperation with the designer will overcome the first drawback.

Also castings should not be specified in a higher-than-necessary grade. It is not economical to specify a 65,000-lb. iron with expensive or critical alloys when a sound 45,000-lb. iron will do the job adequately.

Improved Smokemeter

(Continued from Page 183)

with an automobile-headlight-type lamp with reflector. The advantage of this light source is that it is much cooler than the 200-watt projection lamp used previously, and so avoids overheating. The automobile-type lamp can be operated either with 6-volt batteries or with 110-volt a.c. through step-down transformer.

A recent model smokemeter that incorporates the described improvements is shown in Figs. 3 and 4. The controls and the indicator are housed in one box while the smokemeter tube is separate with provisions to fasten it on the exhaust pipe or other convenient location. The control box connects with the smokemeter tube through a five-wire cable, for the photocell, the lamp and the heater. The heater coil is mounted inside of the window frame so that it does not obstruct its tilting for cleaning. The heater coil is formed of 20 in. of 2.6 ohm/ft. nichrome wire and no adjusting rheostat is necessary.

One intake hole of ¼-in. standard pipe thread and on each end six outlet holes of ⅛-in. diameter are used without sleeves. The advantage of the small outlet holes is that only an imperceptible amount of exhaust smoke contaminates air in the laboratory.

The use of small inlet and outlet holes becomes objectionable if the pressure of the exhaust gas is too low to fill up the smokemeter tube quickly. This will happen if the bleeding point in the exhaust pipe is too close to the outlet into the atmosphere or if the connecting tube between the exhaust pipe and smokemeter tube is too long. The same thing happens in such installations where the exhaust pipe is evacuated by a vacuum pump. In either of these cases it is advisable to employ a vacuum pump to suck the sample through the smokemeter.

The connection to the engine exhaust pipe is of ¼-in. copper tube if the length of the line does not exceed 3 ft. If the line is 3 to 8 ft., ⅜-in. copper tube should be used. The smokemeter installed on the exhaust pipe of a diesel engine is shown in Fig. 5.

There is no more dependable indicator of the quality of combustion in a diesel engine than the exhaust smoke. A clear exhaust is evidence of clean combustion, while a dark exhaust is proof of imperfect combustion. When the exhaust is smoky, high fuel consumption and troubles from soot deposits can be predicted with practical certainty.

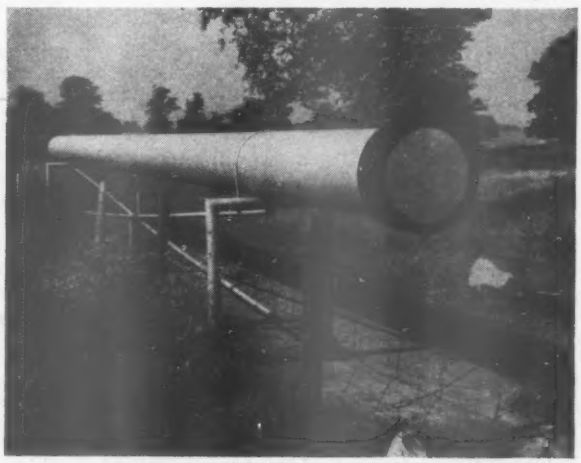
Manufacturers' ratings of a diesel engine is frequently based on the maximum horsepower the engine is capable of delivering with clear exhaust. Clear exhaust, however, is debatable if based on visual observation of the exhaust smoke, while 50 per cent smoke density (determined by an 18-in. long smokemeter) is definite.

Stand for Holding Large Gate Valve

IN the operation of a pipe line, there are occasions when important savings can be effected if gate valves of sizes used on trunk lines are held at pump stations so that they may be readily procured for emergencies. However, these large valves are awkward to store. A crude-oil pipeline company places a valve of this type on a stand, fabricated by a company welder, which holds the valve securely, high enough from the floor to provide for easier handling and to make it possible to keep the floor constantly clean under the valve.

Pipe Repair Joint Protection

THE section of pipe stored along the right-of-way to provide material for emergency repair is sealed by Illinois-Iowa Co. with disk ends fitted within the usual compression-type couplings. These couplings enable the joint to be closed against molestation by gangs of boys, prevent the building of dirt-dobbers' nests within the pipe, which might come loose and possibly clog valves or regulators when the pipe is tied into the line. The pipe is mounted on supports of 2-in. pipe, and held in place with U-bolts passing through the support arms and being bolted thereto. Additional use of the repair joint is made by bringing a drip from the line up under the protection of the joint, thus removing it from danger of possible breakage through agricultural operations in the vicinity. When so placed, the drip is more easily located in time of snow or bad weather.



PIPE-LINE SUGGESTIONS

Improvised Welding Clamps Made In 9 Hours

A CONTRACTOR who was confronted with the job of laying 20-in. pipe at a river crossing had to improvise welding clamps. The work was undertaken at short notice which did not give him sufficient time to secure new clamps. One of his welders made a set of three clamps in 9 hours. As may be observed in the photograph, a clamp of this type was made by utilizing reinforcing steel for river pipe and steel rods. Sides of the clamp are slotted in the positions required for tack-welding in the customary manner.

Rod-Line Knockoff for Two-Well Hookup

AN easily and safely operated rod-line knockoff built from miscellaneous materials and equipment parts is being used on a two-well pumping hookup on an old Oklahoma lease owned by a small independent company. The lever for the throwoff hook has a special latch for holding the hook in or out of position. The rod line is locked or adjusted by means of the holes in the bar through which a pin is inserted. The six legs on which it is set are driven firmly into the ground providing a solid foundation.

OPERATING IDEAS

Stand for Treating-Chemical Injector Helps to Protect Unit From Damage

BY placing the treating-chemical injector for a well on a small stand the operator in this instance not only keeps it up out of the dirt but is able to service it more conveniently. Also, if it were set on the ground, as is common practice, it would be more exposed to damage. The stand is easily constructed, requiring only a few pieces of discarded pipe of small size for legs and some lightweight rod material for bracing. The top is a piece of old sheet metal. The stand could be constructed of wood although this would not be as substantial or as easily cleaned. Note also the special rack for the treating-chemical drum which is kept at the well for refilling the injector.

Portable Lighting Unit for Workover Rig

THE operator of this truck-mounted workover and pulling rig has a small generating unit which provides lighting for night work and power for various needs around the rig. The unit is set on a small skid and can be carried easily on the truck. When on location it can be placed wherever desired, either near or away from the rig. It is equipped with a swing handle constructed either of rods or cable for hooking on with the winch line. The skid was constructed out of a section of old tubing.

For its Vital War

TYPE G·MV ANGLE Compressor

New York Washington Bradford, Pa. Parkersburg, W. Va. Gloucester, Mass.

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

METHODS OF BASING PRICES OF OIL EQUIPMENT AND MATERIALS

THE method of pricing oil-field materials, and hence the cost of this equipment, to the oil producer or drilling contractor, changes along with the economic structure of the nation. These changes are not sudden but are rather a gradual evolution. When noticeable changes are made they do not indicate that the old method was bad but that the new method is better under the existing circumstances.

There are two principal governing factors, the first being the Robinson-Patman chain-store act and the other being the almost nation-wide distribution of the oil industry. The general price structure under which oil-field equipment normally is purchased will be discussed here mainly to help clear up what is often a confusing situation to those field men who are not familiar with it. For instance, one may decide to purchase a certain item after ascertaining the price, only to find that when the bill rolls around it costs considerably more or less than he originally thought. A better understanding of the system used would prevent an argument between the purchaser and the seller.

Bases for Price

Different classes of items are handled in a slightly different manner although the principles are the same. Tubular material, for instance, in normal times carries three separate prices, depending on how it is purchased. The first is the "Mill Basing" price which is considered as 100 per cent and as though the material were being shipped in carload lots from Lorain, Ohio. Thus the Mill-Basing price of one manufacturer on H-40, 17-lb.-per-ft., 5½-in. seamless casing is $68.03 per 100 ft. Freight must be added to get the delivered price.

The second price is the "Mill Depot" price which is 105 per cent of the Mill-Basing price. The Mill-Depot is a point where stocks are generally concentrated for distributing shipment such as Los Angeles, Memphis, and Houston. The additional charge is justified because of the extra handling necessary to maintain such warehouse facilities and yard stocks. The H-40, 17-lb.-per-ft., 5½-in. casing Mill-Depot price is $71.43 per 100 ft. Delivered price is obtained by adding shipping charges. At the present time, due to the war situation, stocks at Mill Depots are depleted and in many cases exhausted and practically all big orders of pipe come direct from the mill.

The third price is the "Out-of-Stock" price, which means the material is taken either from the supplier's store or yard at a point near the field. The price is 110.6 per cent of the Mill-Basing price, bringing the H-40, 17-lb.-per-ft., 5½-in. pipe to $75.12, to which freight must be added. Tubular-material stocks in supply-store yards are low at present and even in normal times the amount of material handled in this manner is small.

Freight Charges

The shipping of the material may be by one of several methods, or a combination of methods, and hence pipe delivered at the same point, but shipped by different means, may have a varying cost. The equipment may be shipped by rail, barge, ocean freighter or truck, or by any combination of these. It is conceivable, but very unlikely, that 14 different methods of shipping and hence as many freight charges could be found for delivery from the mill or mill-depot to the point of use. Actually six or seven is the practical maximum. The important point is to obtain the minimum freight rate practical for the particular purpose and situation of the user.

The situation as far as other types of equipment is concerned is a little different and, at the same time, more complicated. Here there are two prices, direct shipment and out-of-stock, to which shipping charges must be added. In some cases, considerable savings may be effected by making large-quantity purchases through the supplier for direct shipment; in others the direct-shipment and the out-of-stock prices are almost identical. This depends on the particular item and often on the competitive situation of that item in the particular locality. Hence, one must become acquainted with each item to know whether it should be purchased out-of-stock or for direct shipment. General supplies and items purchased singly can ordinarily be purchased out-of-stock as cheaply as by the other method.

Generally, where a company knows that it is going to require a large number of rather heavy-tonnage items, such as in the development of a fairly large field, a quantity-buying price is justified and can be obtained. In such cases, the supplier is guided by the legal restrictions of the Robinson-Patman act and the moral obligation to treat customers alike. Thus, if a price for 200 units weighing 5 tons each is established for one customer, the next customer in the same area wanting a similar number of these items would be entitled to the same price and would get it, unless there had been some material change in the meantime. The anticipation of equipment needs and the standardization on types of equipment so quantity buying can be practiced is an important means of reducing both per well investment and per well maintenance costs. In such purchases, the method of shipment again plays an important role in determining the delivery price at point of use.

Method of Payment

One of the notable changes in the past several years has been the elimination of the preferred-customer list. At the present time the purchases can be made on open account in which case the goods must be paid for on or before the twentieth day of the succeeding month. Payment at the time of the purchase or within 10 days after purchase entitled the buyer to the regular 2 per cent cash discount which has always been standard.

The other method of purchase is on a credit extension or contract basis, In this case, the customer must pay a charge which is a stipulated amount of interest either on the amount of the bill or the balance. This amounts to the same thing as going to a bank and borrowing the money.

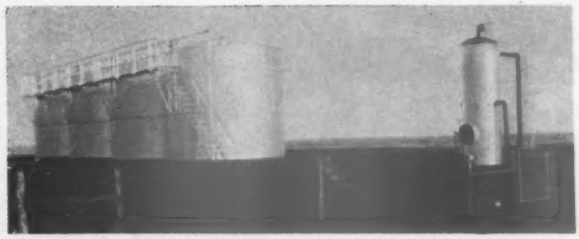
However, regardless of whether the goods are purchased on a cash, open account or contract basis, the price is the same, the only difference being in the manner of payment.

H-W

Oil & Gas Separators
A. P. I. Bolted Steel Tanks
Welded Steel Storage Tanks

HANLON-WATERS 3' x 11' x 125-lb. CU-1S SEPARATOR and Four High 500-Bbl. BOLTED STEEL TANKS

Lease in West Texas Area



H-W Oil and Gas Separators are manufactured for working pressures from 125 pounds to 4,000 pounds. A.P.I.-A.S.M.E. Code Construction, Hartford Steam Boiler inspected, checked and approved. The 125-pound Vessels are available in both Standard Construction and A.P.I.-A.S.M.E. Code Construction. Shop facilities include X-ray inspection and the most modern Laboratory and Annealing Equipment.

Hanlon-Waters also manufactures Automatic Control Equipment and Time Cycle Controls, information available at H-W Office nearest you.

Warehouses at: TULSA, HOUSTON, CORPUS CHRISTI, ODESSA, WICHITA FALLS, BRECKENRIDGE, Texas; HOUMA, Louisiana

HANLON-WATERS, INC.

TULSA, OKLAHOMA

NEW YORK - CHICAGO - PITTSBURGH - PHILADELPHIA - ST. LOUIS
DENVER - LOS ANGELES - SHREVEPORT, LA. - FORT WORTH - HOUSTON
CORPUS CHRISTI and ODESSA, TEXAS

IN THE FIELD OR IN THE REFINERY . . . . .

National Airoil Oil Burners and Airovent Gas Burners *plus our 30 years' specialized experience* may answer your combustion requirements

Above is shown an installation of National Airoil Steam Atomizing Burners firing 3 Scotch Marine type boilers at a large station of an eastern oil company . . . designed, manufactured and installed by us. For more details on National Airoil Oil and Gas Burning Equipment, write us.

NATIONAL AIROIL BURNER COMPANY, INC.

1236 E. Sedgley Ave. Philadelphia, Pa.
ESTABLISHED 1912 INCORPORATED 1917

Allied Steel Buildings

for

ALLIED PRODUCTS STEEL

- Refineries
- Recycling Plants
- Gasoline Plants

Meet new plant housing requirements and needs for enlargement of your present plant

QUICKLY AND SAFELY

- ✓ Low First Cost
- ✓ Low Maintenance
- ✓ Completely Fireproof
- ✓ Nearly 100% Salvage
- ✓ Greatest Portability

Write for Latest Catalog or Send Us Your Requirements
ALLIED STEEL PRODUCTS CORP.
1407 No. Peoria
TULSA, OKLAHOMA

Allied Steel Products Corp. Tulsa

Increase Efficiency 5 Ways with DOUBLE SEAL RINGS

Genuine Double Seal Rings are the only piston rings guaranteed to completely eliminate BLOW-BY —resulting in (1) COMPRESSION increased and maintained, (2) Greater FUEL ECONOMY, (3) Minimum LUBE OIL consumption, (4) REDUCED Ring and Cylinder WEAR, (5) LONGER SERVICE between overhauls. None but genuine One-Piece Double Seal Rings with the NON-BREAKABLE SEALING MEMBER offer you all these advantages.

DOUBLE SEAL RINGS ARE ESPECIALLY RECOMMENDED FOR—

- Diesel Engines • Refrigerating Compressors
- Gas Engines • Air Compressors
- All Types of Steam Engines
- Any application requiring a POSITIVE compression seal.

Write for Specific Information
DOUBLE SEAL RING CO., Fort Worth, Texas
Branch Offices and Factories
157 Chambers Street, New York City
6201 Wilmington Avenue, Los Angeles

DOUBLE SEAL PISTON RINGS
FORT WORTH - NEW YORK - LOS ANGELES

Engineering Fundamentals No. 66

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

NATURAL GAS ANALYSIS BY FRACTIONAL DISTILLATION

HYDROCARBONS of the paraffin series are very similar chemically, which makes it difficult to separate by chemical means the components in a mixture such as natural gas. The boiling points of the various hydrocarbons, however, are sufficiently far apart that fractional distillation can be used to separate them with sufficient accuracy for analytical purposes.

The low-temperature fractional-distillation analysis of a gas consists essentially of liquefying the gas, then distilling the liquid and measuring the quantity evaporated at the boiling point of each pure component.

The apparatus for this type of analysis is illustrated in Fig. 1. The fractionating column (A) is fitted with a cooling chamber (B) at the top and with a distilling bulb (C) at the bottom. A cooling vessel (D) is provided at the bottom of the column for the purpose of cooling and condensing the gas sample. A coil (E) is also provided for heating, if necessary, the distilling bulb to vaporize the higher boiling fractions of the condensed sample. A thermocouple (F) is provided in the vapor tube at the top of the column to measure the temperature of the fractionated vapor. The rate of distillation is controlled by means of the two-way stop cock (G) which acts as a flow-regulating valve.

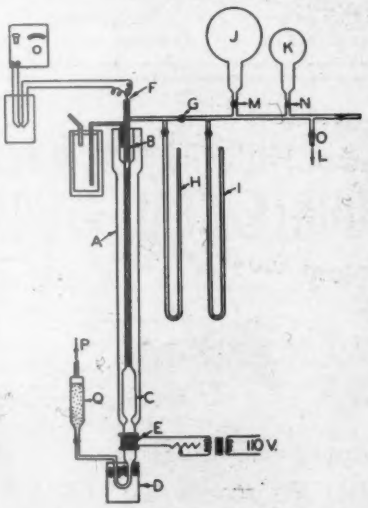


Fig. 1

The manometer (H) measures the pressure in the fractionating column, while the manometer (I) measures the pressure in the evacuated receiving flasks (J) and (K) in which the fractionated vapor is collected and measured. The volume of each receiving flask is accurately known, so that the rising pressure in the flask may be used as a basis for calculating the amount of vapor collected. The temperature of the measuring flasks should be kept constant throughout a test. The flasks and other parts of the apparatus may be evacuated by means of a vacuum pump connected at L.

The procedure for analyzing a gas sample follows:

1. Evacuate apparatus.

2. Introduce liquid air, liquid CO_2, or other suitable refrigerant into gasoline-filled cooling chamber (B) to cool top of fractionating column. This cooling should be continued until top of column is at about —250° F.

3. The cooling chamber (D) should be placed at the bottom of the column fitted with glass wool. Sufficient liquid air, liquid CO_2, or other similar refrigerant should be introduced into this vessel to cool the bottom of the column to about —250° F.

4. Stopcock (G) should be closed to shut off gas from other parts of the apparatus. The stopcock on manometer (H) should be open to measure the pressure in the column.

5. Stopcocks (M) and (N) are opened. Pumping is discontinued. Stopcock (O) is closed.

6. Natural gas is now introduced through connection (P), and passes through drying tube (Q) where water is removed. The gas sample should previously have been stripped of any carbon dioxide, oxygen, or hydrogen sulfide content by absorption in suitable solutions as described in Installment 64.

7. The entering gas, except for nitrogen and some methane, will be condensed by the low temperature and collect in the distilling bulb. The limit of the size of the sample is determined by the capacity of the distilling bulb. It is desirable to have at least 50 cc. of liquefied gas.

8. When the desired amount of sample is secured, the fractionation is started by allowing gas to escape slowly through stopcock (G) into the receiving flasks. If the distillation becomes too rapid, the bottom of the column is cooled by adding more refrigerant to chamber (D). Temperature is also controlled at the top.

A close check is kept on the vapor temperature and pressure in the measuring flask (J or K). While the vapor temperature, as read with the thermocouple, remains constant, the rate of distillation may be quite rapid. But when the temperature shows a tendency to rise, it indicates that a break between two components is being approached, and that the rate of distillation must be reduced by cooling the top of the column. The cooling of the top of the column produces a reflux which runs back down the column. The column contains a wire coil packing which gives more contact between the reflux liquid and the rising vapor. The reflux liquid absorbs the heavier hydrocarbons of the vapor which makes possible the isolation of the most volatile component as a pure product and provides close separation of the various components.

Toward the end of the distillation it may be necessary to apply heat to the bottom of the column. If hydrocarbons heavier than butane are in the gas they must be distilled at pressures below atmospheric. At the completion of the distillation, the pressure in the column and measuring bottle should not be higher than 5 mm. of mercury absolute, so that the residue of the heaviest hydrocarbon left in the column and passages to the flasks will be negligible.

As a final step, the data from the test may be plotted, with vapor temperature as ordinate versus volume distilled as abscissae. Volumes of the various gaseous components so plotted must be corrected to a common condition of pressure and temperature before plotting. From known boiling points of pure components corresponding to the distillation pressure the various components can be identified, and the analysis calculated or read from the plotted relationship.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

PETRO-CHEM ISO-FLOW* FURNACES

NOW SERVE

THE LEADERS OF THE OIL INDUSTRY...

More than 100 Petro-Chem Iso-Flow* Furnaces went into operation and under construction during 1942 for the manufacture of Styrene and Butadiene for Synthetic Rubber, Ethylene, Toluene, Aviation Gasoline, Lube Oils, etc.

Every hour Iso-Flow* Furnaces are proving their special adaptability for high temperature operations and special types of processing.

No new or established process or plant should neglect to take into consideration the many advantages of the ISO-FLOW* Furnace.

*Trade Mark. Patents issued and pending.

PETRO-CHEM DEVELOPMENT CO., INC., 120 EAST 41st STREET, NEW YORK, N. Y.

Representatives: Bethlehem Supply Co., Tulsa, Houston, Los Angeles Faville-Levally Corp., Chicago.

REFINING

California Butadiene Plant Now 75 Per Cent Complete

LOS ANGELES, Calif. — Southern California Gas Co.'s butadiene plant in California is about 75 per cent completed and satisfactory progress in construction of the facilities was reported last week by H. L. Masser, executive vice president. One of the company's gas plants is being converted to the production of unpurified butadiene from naphthas through a contract with the Rubber Reserve Co.

Operation of the butadiene plant may be delayed several months because of tardy delivery of equipment for the purification unit being built by Shell Chemical Co. at Torrance, Calif. In addition to the delays in securing equipment for the purification plant, there is some doubt that sufficient charging stock can be secured for the butadiene unit.

Under the operating agreement, Rubber Reserve Co. is committed to supply naphtha feed stock for the Southern California Gas Co. butadiene unit. Some time ago Rubber Reserve invited bids for 25,000 bbl. per day of naphtha for delivery to Southern California's plant. Bids submitted covered less than 25 per cent of the daily requirements and the government rubber agency since has continued negotiations for the necessary charging stock without success.

Approximately 75,000 bbl. of crude oil will be required to produce the naphtha needed in the Southern California company's butadiene unit. Reluctance of refiners to bid on the daily requirements of 25,000 bbl. of naphtha is because of their uncertain-

Sketches of Plant Operators

RAY C. WHEELER, who joined General Petroleum Corp. as a research chemist in 1918, has been elected a vice president of the corporation. Naming of Mr. Wheeler as a vice president quickly followed his promotion last December to general manager of General Petroleum's manufacturing activities which encompass refining, natural-gas and natural-gasoline operations, laboratories, and the engineering and patent departments. He came to California in 1918 as a research chemist, after previous service in the same capacity for United Gas Improvement Co. of Philadelphia.

His first California work was done in behalf of the U. S. Army Ordnance Department in connection with the development of toluene from petroleum products. S. J. Dickey, president of General Petroleum Corp., was in charge of the company's Vernon refinery in 1917-18 and pioneered the production of toluene in California at that time. Under Mr. Dickey's supervision and with the assistance of Mr. Wheeler, General Petroleum produced a considerable quantity of toluene, the basic ingredient of TNT.

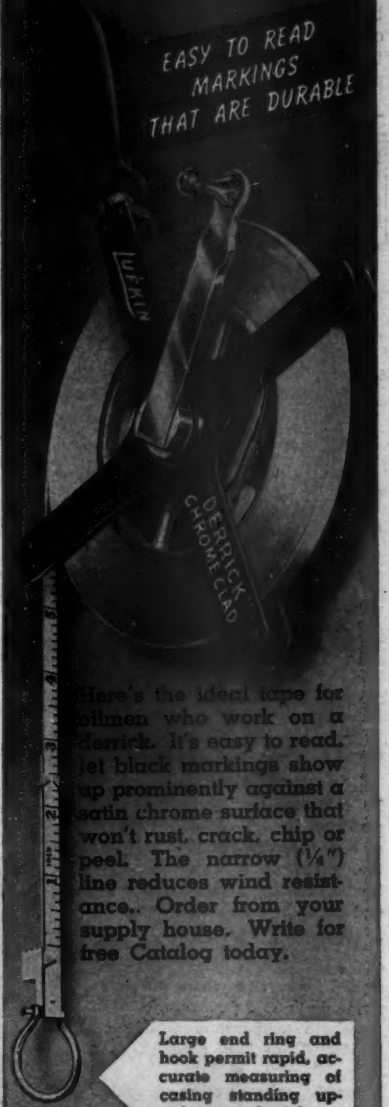
At the close of World War I, Mr. Wheeler was placed in charge of General Petroleum's experiment laboratory. He has since served the company as general superintendent of the gas department and then as manager of natural-gas and natural-gasoline operations until his recent elevation to the vice presidency and manager of manufacturing.

In 1932-33 he was president of the California Natural Gasoline Association and in 1932-34 he was vice president of the Natural Gasoline Association of America.

He resides in Glendale, Calif., has two sons in the Naval Reserve, attending Stanford University at Palo Alto, and a daughter in Glendale High School.

"DERRICK"
CHROME CLAD
STEEL TAPES

EASY TO READ MARKINGS THAT ARE DURABLE



Here's the ideal tape for oilmen who work on a derrick. It's easy to read. Jet black markings show up prominently against a satin chrome surface that won't rust, crack, chip or peel. The narrow (1/4") line reduces wind resistance.. Order from your supply house. Write for free Catalog today.

Large end ring and hook permit rapid, accurate measuring of casing standing upright in a derrick.

LUFKIN
SAGINAW, MICHIGAN • New York City
TAPES . RULES . PRECISION TOOLS

ty that the obligation can be met at the present rate of crude-oil production and at the current rate of demand for military products.

Isomate Process Adapted To Neohexane Recovery

CHICAGO.—Edward G. Seubert, president of Standard Oil Co. (Indiana), announced last week that a "new and excellent" process for the manufacture of neohexane has been developed in Standard's laboratories. The development is important, he said, in connection with the petroleum industry's undertaking to supply increased quantities of high-octane fuels for the Allied air forces.

Neohexane is regarded as one of the best materials to blend with other petroleum derivatives to make fuels for high-powered airplanes.

In Standard of Indiana's new process, atoms of other and more common hydrocarbons are rearranged in the pattern which distinguishes neohexane.

While the new process discovered in Standard's laboratories will not by any means make neohexane as abundant or cheap as ordinary gasoline, it does offer promise, Mr. Seubert said, for increasing economically the quantity and the quality of aviation fuel.

The new process resulted, according to Mr. Seubert, from further work carried out by Standard of Indiana's staff on the naphtha-isomerization process announced by the company a year ago. The naphtha isomerization, or "isomate" process is a way of converting ordinary naphthas into an improved product. The "neohexane" process gives a product of still higher octane number.

Details of the new process will not be made public, Mr. Seubert stated, owing to government secrecy restrictions applicable in wartime. With the approval of appropriate authorities, however, essential information concerning it is available to companies now manufacturing or contemplating the manufacture of 100-octane aviation gasoline, so that the advantages the process offers can be utilized for the benefit of the air forces with the least possible delay.

The new process can also be used for the manufacture of isopentane, a hydrocarbon extensively utilized in high-octane fuels.

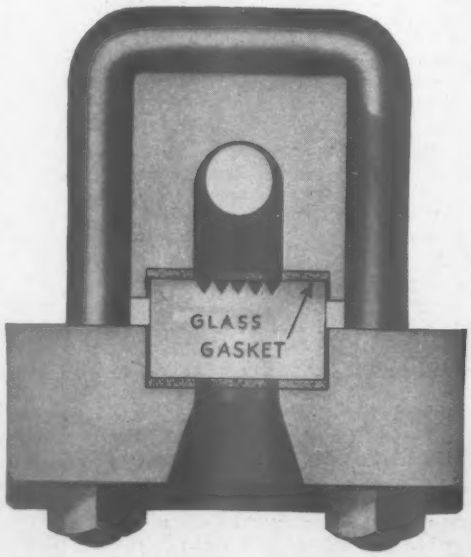
JERGUSON Reflex Gage Construction

for STRENGTH for DURABILITY

THE U-Bolt method of assembling parts into apparatus to be subjected to high pressures is accepted by all design engineers as exceptionally sound. And when the stress parts themselves are forged or alloy steel, then strength and durability are doubly assured.

The above is a brief description of the JERGUSON Reflex Gage, designed for service where pressures range up to 3200 pounds (at 100°F.) or where temperatures range up to 1000°F. (at 1200 pounds).

When the color or other characteristics of the liquid must be observed, we recommend our Transparent Gages. They're designed for pressures up to 2000 pounds (at 100°F.) or for temperatures up to 1000°F. (at 600 pounds).



JERGUSON GAGE & VALVE CO.
85 Fellsway
SOMERVILLE, MASS.

1-JV-3

WPB Cuts Number of Types Of Valves Nearly in Half

Refiners will have to get along henceforth on a restricted selection of valves.

The number of types of gate, globe, angle, cross and check valves now produced will be reduced from 4,079 to 2,504 under Limitation Order 252 issued January 23 by the War Production Board.

Regardless of the pressure class, brass valves may be manufactured only in sizes of 2 in. or less.

Steel valves in pressure classes of 150, 600, 900 and 1,500 lb. are to follow specifications set by the A.P.I. or the American Standards Association.

Pennsylvania Refinery Conversion Progressing

OIL CITY, Pa.—Work of converting the cooperative thermal cracking plant here which serves Continental Refining Co., the Pennzoil Co., Quaker State Oil Refining Corp., and Wolf's Head Oil Refining Co. refineries to a catalytic operation is now in progress. When conversion work is completed, the cooperative cracking unit will supply charging stock to a government-owned plant now being constructed on adjoining property for the manufacture of 100-octane gasoline.

The four independent Pennsylvania refiners are expending $1,600,000 on the conversion and expansion program at their cracking plant. Capacity of the converted unit will be 8,400 bbl. daily when the catalytic process is placed in operation.

Natural Gasoline

Texas' Outlet Increases to Daily Rate of 126,553 Bbl.

AUSTIN, Tex.—Production of condensate, natural gasoline, butane and propane and other liquids from gas wells and processing plants in Texas increased to a daily average of 126,553 bbl. in November 1942, a gain of 7,263 bbl. over October and 8,033 bbl. higher than reported in September.

Most of the increased production for all light liquid products was in natural gasoline, output of which averaged 83,179 bbl. daily in November, nearly 1,000 bbl. greater than the rate of 72,334 bbl. per day prevailing in October. Production of butane and propane declined in November to 13,192 bbl. daily compared with output of 18,255 bbl. daily in October and 15,125 bbl. per day in September.

Condensate production increased to 24,542 bbl. daily compared with 23,986 bbl. per day in October and 20,886 bbl. daily in September.

There were 150 natural-gasoline plants reported in the November summary, including one dehydration installation; 28 recycling plants were in operation and 163 pressure-maintenance and repressuring plants.

Carbon-black production for the month totaled 1,119,286 lb. daily.

Production Increases to 239,000 Bbl. per Day

Production of natural gasoline and allied products increased to a daily average of 239,000 bl. in November, the Bureau of Mines reported last week in the data prepared under supervision of G. R. Hopkins. Gains were particularly outstanding in the Texas Panhandle, the Gulf Coast and in West Virginia where a new plant went on production during the month.

The Bureau of Mines' production figures on natural gasoline include yields of cycle products and liquefied petroleum gases manufactured outside of refineries. The total production of 300,552,000 gal. reported for November is broken down as follows: Natural gasoline, 167,790,000 gal.; cycle products, 55,902,000 gal.; isobutane at natural-gasoline and cycle plants, 11,424,000 gal. and liquefied petroleum gas at natural-gasoline and cycle plants, 65,436,000 gal.

Isobutane production increased almost 1,000,000 gal. over the output in October, reflecting the greater use and demand for this fraction in the manufacture of aviation fuels, synthetic rubber and other war materials.

Production of light hydrocarbon products during the first 11 months of 1942 totaled 76,051,000 bbl., a daily average of 228,000 bbl., compared with 219,000 bbl. per day for the same period a year ago.

Natural-Gasoline Production
(Thousands of gallons)

	1942	
	Nov.	Oct.
W. New York	1	2
W. Pennsylvania	1,475	1,292
West Virginia	9,279	8,531
Ohio	439	513
Illinois	13,009	13,417
Kentucky	3,278	3,216
Michigan	135	149
Kansas	7,335	6,806
Oklahoma	37,633	39,020
Texas	133,925	135,055
Arkansas	3,738	3,867
Louisiana	26,223	26,719
New Mexico	7,336	7,456
Colorado	35	29
Montana	421	356
Wyoming	3,265	3,360
Californria	53,025	54,964
Total	300,552	304,752
Daily average	10,018	9,831
Total (thous. of bbl.)	7,156	7,256
Daily average	239	234

Liquefied-Gas Producers Urged to Adjust Economics

NEW YORK.—Manufacturers of liquefied petroleum gas were urged here this week to utilize inherent advantages of this period to perfect operations and economics in order that they may take their proper place in the nation's fuel picture with return of peace. This advice was given by Paul M. Raigorodsky, assistant director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, who addressed the thirtieth annual meeting of the Compressed Gas Manufacturers Association, Inc., January 26.

Important position of liquefied petroleum gases in the production of aviation gasoline, synthetic rubber, toluene and other war products was stressed. Mr. Raigorodsky pointed out that potential daily supply of butanes at refineries and natural-gasoline plants is estimated at 400,000 bbl. He said that modest expenditure of new critical material would make a much greater amount of liquefied petroleum gas available and that such production would materially enhance the war-production program. The value of the available gases, he said, greatly surpasses the expenditure of equipment necessary to recover the hydrocarbons and for transporting them to various centers for conversion into the war products most urgently needed.

Natural Gas

All Hugoton Drilling Prohibited by PAW Order

WASHINGTON, D. C.—All drilling operations in the Hugoton gas field of Kansas and Oklahoma were brought to an abrupt halt January 23 by issuance of a Petroleum Administration order prohibiting the use of materials to drill, complete or provide additions to any well in the area. The order applies to any wells in any discovered or undiscovered natural gas field in Kearney, Finney, Grant, Haskell, Morton, Stevens and Seward counties, Kansas, or in Texas County, Oklahoma.

The order terminated plans or proposals of at least two operators to extend their development program. Cities Cervice had announced plans for drilling 100 new wells in the area, contingent on permission to construct a new 26-in. gas line from the area into the St. Louis, Mo., region, and Peerless Oil & Gas Co., San Antonio, Tex., last week filed application with the Oklahoma Corporation Commission for permission to drill eight wells in the Guymon sector of Texas County.

Ralph K. Davies, deputy petroleum administrator, said that the use of scarce materials for drilling wells whose production cannot be made available to consumers because of lack of transportation facilities was not in the public interest or the war program.

The Hugoton field contains approximately 330 wells and several are now shut in because pipe-line capacity serving the area is insufficient to handle all available production.

At a Federal Power Commission hearing in Kansas City, Mo., last week, A. W. Ambrose, vice president and general manager of Cities Service Gas Co., expressed doubt that the company's request for steel with which to build the new line from Hugoton would be honored by the WPB.

West Panhandle Sour Gas Quota Set for February

AUSTIN, Tex.—Allowable production of 647,956,000 cu. ft. daily for the sour-gas area of the West Panhandle field was set last week for February operations.

CRC

PIPE LINE
CONSTRUCTION
EQUIPMENT

CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

JAMES ANDERSON COMPANY
ENGINEERS and SURVEYORS
Established in 1893
available to the oil and gas industry for the surveying of extensive rights-of-way anywhere
JAMES ANDERSON COMPANY
290 East Deerpath
LAKE FOREST, ILLINOIS

PIPE LINE REPAIR CLAMPS
EFFICIENT—ECONOMICAL
More than 45,000 sold

Fig. 7002 Fig. 7001
MADE WITH 1 OR 2 U-BOLTS
In Stock for Immediate Shipment
BROWN & BROWN, Incorporated
LIMA, OHIO, U. S. A.

PIPE LINES

WEP Mississippi River Crossing Is Completed

Laying of pipe across the Mississippi River for War Emergency Pipelines, Inc., was finished at 4 a.m. January 20. The entire 24-in. trunk line between Longview, Tex., and Norris City, Ill., is now completed. Operations continue in filling the line and testing which began early this month. Progress has been somewhat impeded as the head of the stream moves through the rough bauxite country south of Little Rock, Ark.

Construction of Longview, Tex., station of WEP 24-in. crude-oil line recently put in operation

The Longview station of WEP is now in operation. Oil is being pumped into the WEP line in East Texas by stations of Pan American and Texas-Empire-Tidal. When pressure is raised to 850 to 900 lb. for testing, pumps of the Atlas station in East Texas are also utilized. Within a short time the stations of Atlantic, Sun-Stanolind, Shell, and Humble are expected to be pumping into the line. Later, stations of Gulf and Sinclair will also pump, and possibly a station of Bell General. Preparations are being made to have one of the large tanks at the WEP Longview terminal float on the line.

As a temporary measure a diesel-driven mud pump has been installed at the WEP Eau Frais station near Donaldson, Ark. (No. 4). It is possible that more mud pumps, the type normally used on rotary drilling rigs, may be procured for service from the East Texas area while the line is being filled.

The Little Rock station has been completed and is ready for operation. Stations 3, 7, 9a, and 9b will be operating in February soon after the arrival of certain equipment items. Other stations will not be ready before the end of February.

This week, the headquarters office of WEP will be moved from Little Rock, Ark., to Cincinnati, Ohio, where the address will be Inquirer Building, 617 Vine Street, Box 1638.

Decision on Second WEP Line May Come This Week

WASHINGTON, D. C.—Meetings are being held here this week which may result in an early decision to lay a second WEP line. Consideration has been given recently to plans for a 20-in. products line starting in the Houston and Beaumont-Port Arthur areas and extending to a loading rack at Seymour, Ind. Construction would probably not start before April. It is not anticipated that products will be received from the El Dorado, Ark., refineries since the Project 5 system appears to be adequate for transportation needs in that area.

Humble to Convert United Gas Line to Oil for DPC

Humble Pipe Line Co. is to act as agent for Defense Plant Corp. in the conversion of a natural-gas line to crude-oil service between Refugio and Pierce Junction, Tex. DPC last week purchased the line from United Gas Pipe Line Co. The gas line purchased for conversion consists of 150 miles of pipe. Between Edna and Pierce Junction, Tex., the line is 16 in. and between Edna and Refugio, Tex., it is 14-in. pipe. It will handle 50,000 bbl. of crude and 25,000 bbl. of heating oil, making a total of 75,000 bbl. daily, originating in the Corpus Christi area.

In addition to the oil to be delivered through the converted line to Humble's Baytown refinery, some will go to Beaumont, Tex., refineries.

Part of the deliveries may be taken by the other Gulf Coast refiners who will build connecting lines to their own plants. There has been some discussion as to whether some of the oil might be available for shipment through the WEP line.

The line will be extended about 15 miles beyond Pierce Junction to Texas Co. storage at Galena on the north side of the Houston Ship Channel. Five pump stations will be installed; four of these will have electric centrifugal units while the fifth will be diesel powered. Work will start immediately and will be completed in about 90 days.

The Humble organization already has a line from Corpus Christi to Ingleside and a line from Ingleside to Refugio. Consequently, it does not need to build a feeder system. Several other lines will serve as feeders. Atlantic has a line from the Aransas Pass area to Refugio. Texas, Barnsdall, and La Rosa Pipe Line Co. have lines from Corpus Christi to Refugio, all or part of which can be tied into the new converted trunk system.

Stanolind Adds to Pump Stations in Oklahoma

To provide for increased shipments from Texas northward, Stanolind Pipe Line Co. is preparing to move a 600-hp. pumping unit from one of its stations in Wyoming to the Healdton station, Oklahoma, where plans call for building new foundations and extending the building. The company expects to proceed with work outlined several months ago for installing two electric-driven reciprocating pumps at the Devol station, Oklahoma, which, with the exception of the station building, was dismantled some time ago.

During the past year, Stanolind has been moving 24,000 bbl. of crude daily from the Houston, Tex., area, half of which has been gathered by Stanolind and half by Humble Pipe Line Co. In addition to continuing this movement, Stanolind has been making preparations for moving 10,000 bbl. daily northward for Project 1. Status of Stanolind's looping program in North Texas and Oklahoma was described in the January 21 issue, page 61. The company has been taking up one of its two 8-in. lines between Pauls Valley and the Fitts pool, Oklahoma, for use in connection with the looping program.

Johnson Ranch Pool Outlet Is Provided

Texas Co. interests will build a pipe line to the Johnson Ranch pool in western Foard County, North Texas, which has been without an outlet since abandonment of the Gulf and Magnolia line from the Panhandle area to Ranger. The company will lay a 19-mile combination 2 and 3-in. line which will connect to its North Texas system in the western part of the county. Texas Co. has been moving the oil out of the pool by truck since the abandonment of the line.

Report Shows Gain in Kansas Pipe-Line Runs

Pipe-line runs of Kansas crude oil averaged 307,467 bbl. daily in the week ended January 18, a gain of 6,826 bbl. over the previous week, the state Corporation Commission's Conservation Division reported last week.

The figure was 4,100 bbl. below the all-time high of 311,567 bbl. recorded during the week ended November 18.

History of WEP Reflects Close Cooperation

Building of the WEP line required less time than did the negotiations. Some of the important dates in the history of the WEP project are as follows:

July 20, 1940: Harold L. Ickes reported to president suggesting building of such a line, construction of additional ocean tankers and increase in stocks of petroleum products on East Coast by 3,600,000 bbl.

May 1941: More than 50 ocean tankers were transferred from coastwise routes to British service.

June 1941: Conferences of major pipe line executives led to studies for Texas-New York line.

September 1, 1941: Aerial survey of route and plans for project were completed.

September 8, 1941: National Defense Pipelines, Inc., and Emergency Pipe Lines, Inc., were incorporated.

October 2, 1941: SPAB denied application for materials for system proposed for connecting Longview, Tex., Wood River, Ill., Salem, Ill., and the New York-Philadelphia area.

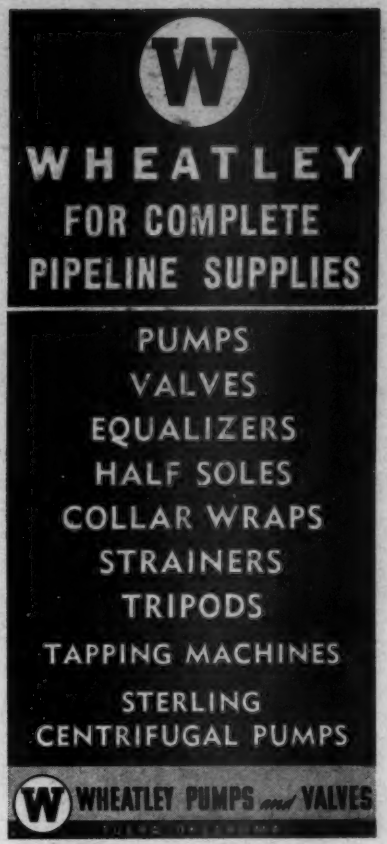
February 1942: Petroleum Coordinator Ickes urged reconsideration and the following month applied for steel for a Texas-East Coast line from WPB.

June 10, 1942: WPB authorized allocation of 137,000 tons of steel for Longview, Tex.-Norris City, Ill., 24-in. crude-oil line.

August 3, 1942: Construction started.

October 26, 1942: Building of extension from Norris City to East Coast approved by WPB. Total steel required for line from Texas to New York-Philadelphia area is 367,000 tons.

As the war has progressed the attitude toward the WEP project on the part of military and naval authorities has changed since Harold L. Ickes first proposed it.



•

More pipe-line information is published each week in the Journal

•

More pipe-line men subscribe to the Journal

•

More manufacturers of pipeline equipment advertise in the Journal

•

3 reasons why The Oil and Gas Journal is considered first in the pipe-line industry.

•

The "SECRET"

OF EFFECTIVE EXPLORATION WORK:

. . . is found in the simple formula of using experienced crews, giving them thorough methods of procedure and improved instruments to use . . . plus careful supervision.

IXØ

Independent

EXPLORATION COMPANY

★ HOUSTON ★ TEXAS

Exploration and Drilling

Week's Highlights

CALIFORNIA: Oil is reported in the lower Gatchell pay in a test several miles southeast of the tip of Coalinga Nose. Several deep tests are contemplated in the Midway-Sunset field. Work is about to commence on the Gilmore Island test in Los Angeles whose success or failure will determine whether or not California will have an indoor oil field. Drilling has been suspended at the Rincon deep test (p. 204).

OKLAHOMA: The Wilcox discovery west of Shawnee made 336 bbl. in 11½ hours through choke. It is shut down for storage. East Watchorn has been defined on the northwest (p. 207).

OHIO: The Washington gas pool in Holmes County has been extended 1 mile northeast (p. 211).

TEXAS GULF COAST: A wildcat test southeast of Magnolia, Montgomery County, has opened a new oil field and also proved the presence of a commercial accumulation of distillate (p. 213).

PERMIAN BASIN: Recent completions on the west side of the Slaughter pool indicate a spreading of production in that direction. Many new locations are reported in the West Texas district (p. 206).

NEW MEXICO: A new pay has been found in the Jackson pool, Eddy County. Showings are reported in the Simpson in Lea County's deep test (p. 206).

KANSAS: A new Arbuckle lime pool has been opened in Pratt County and reports of a Phillips County test indicate that it will also open a new pool. Showings are reported in the Topeka lime in a Russell County wildcat (p. 214).

ROCKY MOUNTAIN STATES: Operators are watching the efforts of the Government to speed up transportation to the East and are visualizing similar steps to supply the Pacific Northwest from Montana and Wyoming. A price increase of 10 cents has been granted for Wyoming heavy fuel oil (p. 208).

EAST TEXAS: Nacogdoches County's Travis Peak distillate discovery is to be acidized in an attempt to step up production. A south offset to the Quitman discovery is in the top of the Paluxy with no shows reported (p. 209).

NORTH TEXAS: Simpson production at Walnut Bend has been extended 2 miles east. There is still some question as to the age of the pay, some geologists placing it in the Strawn (p. 209).

LOUISIANA GULF COAST: A sidetracked dry hole on the flank of she Pine Prairie dome has been recompleted as a Sparta sand producer. A gas-distillate discovery is in prospect 8 miles south of Schooner Bayou (p. 217).

SOUTHWEST TEXAS: A Duval County test east of Fitzsimmons which had gas in the Government Wells sand reports oil showings in the Pettus. Permit for dual completion has been requested (p. 217).

WEST CENTRAL TEXAS: Wimberly has been defined by a dry hole on the northwest. Drilling is on the increase in Jones and Taylor counties (p. 209).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended January 23, 1943)

	Oil	Gas	Dry	Total	Footage	Comp. to date 1943	Comp. to date 1942*
N. Y., Pa., and W. Va.	45	15	2	62	111,405	169	311
Ohio	1	10	4	15	38,176	34	75
Indiana	2	0	2	4	7,598	10	32
Kentucky	0	0	0	0	0	4	19
Illinois	17	0	11	28	65,770	101	181
Michigan	6	1	1	8	21,471	28	47
Kansas	9	0	8	17	56,565	72	110
Nebraska	0	0	1	1	2,000	3	3
Missouri, Iowa	0	0	0	0	0	0	0
Oklahoma	7	1	6	14	40,561	60	98
Texas:							
North Central Texas	9	0	18	27	68,155	73	98
West Texas	15	0	7	22	90,991	51	132
Texas Panhandle	1	5	0	6	17,040	16	53
Eastern Texas	3	0	6	9	41,593	14	37
Texas Gulf Coast	5	0	5	10	63,120	29	69
Southwest Texas	5	0	7	12	54,669	56	100
Total Texas	38	5	43	86	335,568	239	489
North Louisiana	3	0	5	8	40,148	18	52
Louisiana Gulf Coast	5	1	2	8	70,435	29	50
Total Louisiana	8	1	7	16	110,583	47	102
Arkansas	3	0	2	5	31,663	11	11
Mississippi and Southeast	0	0	1	1	10,405	1	8
Montana	2	6	1	9	12,627	17	11
Wyoming	2	0	1	3	12,883	9	4
Colorado, Utah	0	0	0	0	0	1	1
New Mexico	4	0	2	6	19,084	15	22
California	17	0	1	18	49,902	46	81
Total United States	161	39	93	293	926,261	867	1,605
Total previous week	183	30	107	320			
Week ended Jan. 24, 1942	314	51	125	553			

*Revised.

CALIFORNIA

Gatchell Sand Shows Oil in Test West of Coalinga Nose

LOS ANGELES, Calif.—Standard Oil Co. may have found new oil field a few miles southeast of the tip of the Coalinga Nose field in Fresno County as well 82-29-F Pleasant Valley Farms on a formation test showed up very good. With a 900-ft. water cushion and open 45 minutes well showed 5,350 ft. of gas, then 290 ft. gassy oil, then 750 ft. of gas, then 390 ft. of oil. Gas hit the surface in 12 minutes and was very strong. Wildcat is bottomed at 8,965 ft. and formation test was from 8,942-65 ft. with the bit still in oil sand when drilling concluded. Tested interval is believed to be equivalent of basal Gatchell sand of Eocene age which has been found highly productive in Coalinga Nose field. This wildcat is located in NW 24-20s-16e.

Drilling progress was slowed up in a number of wildcat wells during the current week due to inclement weather. This was particularly noticeable in wildcats somewhat removed from highways where roads had washed out or become impassable. The delay was only of a temporary nature, however, and work will be in full swing again shortly. Shell's 66-22 Henderson wildcat at Nicholson in the San Joaquin Valley showed up a little better this week when it began showing gas at 11,475 ft. This necessitated a change of drilling fluid but drilling operations have again been resumed. This is the first encouragement of any consequence that this wildcat has showed and developments during the next few weeks will be watched with interest. This is a joint test with Standard Oil Co., both companies participating in drilling costs and Shell doing the actual drilling. Up in Butte County, Superior's I Dodge Lands Co. in 31-20n-1e has been showing an increasing volume of gas and at 5,500 ft. it was necessary to fortify the drilling mud. This wildcat is being drilled in search of commercial gas production and the present formation is a sandy shale of probable Cretaceous age.

Texas Co.'s Gill wildcat in 16-13s-16e at Mendota in the San Joaquin Valley has not given any encouragement since passing through the oil sand logged at 4,226-75 ft. and the gas sand at 4,419-95 ft. The oil sand tested wet when a formation test recovered gas-cut mud and considerable salt water but there is no question about the gas sand as it showed a potentiality of 10,000,000 cu. ft. of dry gas per day. There is a possibility that this wildcat is an edge well and for this reason Texas will undoubtedly undertake additional drilling upon the conclusion of the present well. If deeper drilling fails to yield commercial production the hole will be plugged back to the gas sand at 4,419-85 ft. This is practically the only wildcat in the state at the present time. At the close of the current week drilling operations were still under way at 8,400 ft. This wildcat is located in Madera County and is the best looking wildcat ever drilled in that county.

DAILY AVERAGE PRODUCTION FOR WEEK

	Jan. 23 crude oil	Jan. PAW quota all oils	Jan. 16 crude oil
Arkansas	75,050	78,300	75,150
California	775,275	815,000	783,500
Colorado	6,100	7,000	6,290
Eastern fields	91,000	107,600	93,100
Illinois	228,450	272,600	235,000
Indiana	15,000	17,200	17,000
Kansas	307,500	310,000	300,650
Louisiana	338,200	347,500	339,850
North Louisiana	90,500	.....	92,800
Louisiana Gulf Coast	247,700	.....	247,050
Michigan	58,900	63,700	62,400
Mississippi	57,500	50,000	58,550
Montana	19,330	24,700	20,660
Nebraska	2,700	3,400	3,000
New Mexico	104,530	105,300	104,550
Oklahoma	346,650	400,600	347,400
Texas	1,330,900	1,426,800	1,339,700
East Texas	327,000	.....	327,000
West Texas	201,100	.....	200,000
North Central Texas	136,700	.....	136,400
East Central Texas	101,600	.....	101,000
Texas Panhandle	83,400	.....	88,600
Texas Gulf Coast	409,300	.....	420,600
Southwest Texas	66,200	.....	66,100
Wyoming	92,250	94,500	93,200
Total United States	3,949,325	4,124,200	3,980,000
Total production Jan. 1-Jan. 23, 1943			83,674,795 bbl.
Same period last year			96,094,730 bbl.

The Midway-Sunset field is receiving considerable attention at present and it is quite likely that eventually deep drilling will be started at several points to determine whether the probable lower horizons are productive. Several years ago, Standard Oil Co. drilled a deep test on the Mascot property at Midway-Sunset but just when a test was to be made Standard paid Mascot a bonus to allow development work to be held in abeyance pending improvement in conditions. This was done but when Standard went back into the hole 2 years later the oil sand that had been found and which had prompted delaying development work could not be found. This deep test was originally abandoned but there is every indication that eventually some additional deep drilling will be undertaken in this field. Honolulu Oil Corp. drilled a deep dry hole in the Buena Vista Hills section of the Midway-Sunset field of Kern County and appears to have definitely disproved the existence of commercial production of crude oil. There is another separate anticline in the Buena Vista Hills area and while this has not been given a deep test it appears to be too close to the original deep test to have any change in subsurface conditions. Honolulu failed to find the Stevens zone of Miocene age although the test well did go quite deep into the Miocene. At the time the Honolulu deep test was the most important well under way in the state because if it had found prolific production it would have opened up the entire Buena Vista Hills section of the Midway-Sunset field and given the state a trenmendous crude oil reserve. Obviously the failure to develop production in the Stevens sand in the Buena Vista Hills area proved a distinct disappointment not only to operators holding acreage on the two anticlines but to the industry in general as this area would have provided the state's largest reserve. The outlook for deep production in the Buena Vista Hills area looked so good that a complete program covering drilling and production activities had been prepared ahead of time in order to eliminate any possibility of overdevelopment. This plan was previously signed by all operators involved long before any thought had been given to drilling a deep test. The program that had been prepared for development of this field did not constitute unified development except in so far as it provided the maximum number of well that could be drilled, specified the spacing interval and location of future wells. Operators were to do their own drilling and take their own production.

SAN JOAQUIN VALLEY COMPLETIONS

Antelope Plains, Kern County: Texas Co. 53-6 Voight, 6-28s-20e, flowed 170 bbl., 17.3-gravity, 2 per cent cut, 48/64-in. bean, pressures 30/180 lb., T.D. 2,313

ft., 160 mesh perf. 2,309-2,310 ft., top 23-6 zone of Miocene age 2,132 ft., top of 45-6 zone of Miocene age 2,202 ft., completed in 45-6 Williams zone of Miocene age.

Belridge, South, Kern County: General Petroleum Corp. 15-A-3 fee, 3-29s-21e, pumped 15 bbl., 15.5-gravity, 22 per cent cut, T.D. 815 ft., perf. 529-62 ft., 620-810 ft., completed in upper Belridge zone of Pliocene age.

General Petroleum Corp. 34-3 fee, 3-29s-21e, pumped 46 bbl., 15.5-gravity, 3 per cent cut, T.D. 804 ft., perf. 451-794 ft., completed in upper Belridge zone of Pliocene age.

Kern Front, Kern County: Standard Oil Co. 9-8 fee, 8-28s-27e, pumped 142 bbl. net oil, 14.1-gravity and 26 bbl. water, T.D. 2,870 ft., 100 mesh perf. 2,675-2,868 ft., completed in Kern Front zone of Pliocene age.

Lost Hills, Kern County: Universal Consolidated Oil Co., 18-D fee, 30-26s-21e, pumped 51 bbl., 17.1 gravity, 27 per cent cut, T.D. 1,515 ft., perf. 915-1,514 ft., completed in Lost Hills zone of Pliocene age.

Midway-Sunset, Kern County: Chanslor-Canfield Midway Oil Co. 21-27-G fee, 27-31s-22e, pumped 5 bbl. net oil, 12.2-gravity, 60 per cent cut, T.D. 1,129 ft., perf. 405-1,129 ft., completed in upper Midway-Sunset zone of Pliocene age.

Richfield Oil Corp. 13 Southwestern, 2-31s-22e, pumped 70 bbl. oil, 16.3-gravity, 50 bbl. of water, T.D. 1,195 ft., perf. 996-1,120 ft., completed in upper Midway-Sunset zone of Pliocene age.

Standard Oil Co., 71-29-B fee, 29-31s-23e, pumped 54 bbl. oil, 25.3-gravity, 32 bbl. of water, T.D. 3,035 ft., perf. 2,920-3,030 ft., completed in Midway-Sunset zone of Pliocene age.

Standard Oil Co., 118-5-K fee, 5-11n-23e, pumped 62 bbl., 27.6-gravity, 2 per cent cut, T.D. 2,801 ft., 60 mesh perf. 2,786-99 ft., completed in upper Midway-Sunset zone of Pliocene age.

Standard Oil Co., 119-27-B fee, 27-31s-23e, pumped 20 bbl. oil, 27.7-gravity, and 24 bbl. of water, T.D. 3,020 ft., perf. 2,905-3,007 ft., completed in Midway-Sunset zone of Pliocene age.

Mount Poso, Kern County: Chanslor-Canfield Midway Oil Co. 18 Mon, 28-27s-28e, pumped 68 bbl., 15.9-gravity, 10 per cent cut, T.D. 1,535 ft., perf. 1,473-1,535 ft., completed in Vedder zone of Miocene age.

Union Oil Co. 38 Sarrett & Mack, 4-27s-28e, pumped 54 bbl., 15.7-gravity, 85 per cent cut, T.D. 1,888 ft., perf. 1,818-87 ft., completed in Vedder zone of Miocene age.

Riverdale, Fresno County: Amerada Petroleum Corp. 2-23 Courtney, 23-17s-19e, flowed 284 bbl., 38.5-gravity, 0.1 per cent cut, 233,000 cu. ft. gas, 15/64-in. bean, pressures 850/925 lb., T.D. 6,900 ft., gun perf. 6,796-6,815 ft., completed in Lawton zone of Miocene age.

Tejon wildcat district, Kern County: Reserve Oil & Gas Co. 34-1 Tejon, 34-11n-19e, dry in gray sand and shale, T.D. 4,926 ft., few colors noted along with small quantity of gas but nothing of a commercial nature logged.

Drilling Operations Suspended at Deep Test In Rincon Field

After encountering a series of misfortunes during drilling operations on 10-C Hobson in the Rincon field of Ventura County, Chanslor-Canfield Midway Oil Co. has suspended drilling operations at 10,065 ft. and will allow the hole to stand idle with a possible abandonment at an early date. This deep test never reached its main objective due to mechanical trouble and thus the deep zone possibilities of the Rincon field must remain undetermined. When a depth of 10,065 ft. had been reached it was necessary to come back up the hole and begin a redrilling job. This proceeded slowly until a depth of 9,322 ft. had been reached when a twist-off left drill pipe and bit in the hole.

(Continued on Page 220)

December Completions Show Gain Over Previous Month

PACED by the Mid-Continent areas drilling was stepped up by 101 completions last month and at the close of the month there were 68 more operations than at the beginning. The upturn in activity in the triangular area including East and West Texas and Kansas is due to the recent discoveries in those areas and the development drilling necessitated by the gradual extension of a number of pools. This sector promises at present to become increasingly active as most of the potentially favorable locations are included in it.

Oklahoma and Kansas together account for an increase of 78 completions, including 32 more oil wells.

Dry holes numbered 494 in December, an increase of 58 during the month. California had 30 dry holes, an increase of 24 and most of the area west of the Mississippi showed smaller increases. Illinois showed a decline of 33 completions, including 10 dry holes, suggesting a slight decline in wildcatting.

SUMMARY OF OPERATIONS, DECEMBER 1942

	Comp.	Oil	Prod.	Gas	Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Footage	Drlg.
Appalachian	294	228	245	51	15	0	259	23	12	0	540,213	262
Ohio	90	14	315	49	27	8	31	51	0	0	232,725	169
Indiana	21	5	199	3	13	5	12	4	0	0	34,028	52
Kentucky	27	18	3,600	2	7	0	10	17	0	0	58,393	49
Michigan	34	16	1,530	2	16	0	20	14	0	0	83,454	100
Illinois	183	111	14,484	2	70	8	75	100	0	0	545,854	244
Kansas	132	58	33,487	8	66	1	13	117	1	0	457,351	177
Nebraska	4	0	0	0	4	0	2	1	1	0	14,732	22
Missouri, Iowa	0	0	0	0	0	0	0	0	0	0	0	11
Oklahoma	125	52	8,557	10	63	4	33	72	16	0	422,646	231
North Texas	61	29	9,762	1	31	9	21	16	15	0	194,880	104
West Central Texas	36	11	3,258	4	21	8	15	12	1	0	82,359	61
West Texas	78	61	26,100	0	17	0	11	34	32	1	360,863	146
Texas Panhandle	24	15	1,850	7	2	0	0	22	2	0	79,523	47
East Texas	36	19	5,860	0	17	0	0	15	21	0	190,410	16
Upper Gulf Coast	34	13	2,270	1	20	0	0	4	27	3	228,977	64
Lower Gulf Coast	24	15	1,698	1	8	0	0	4	20	0	143,449	12
South Central Texas	3	1	40	0	2	1	2	0	0	0	5,652	10
South Texas	24	3	326	0	21	0	1	10	12	1	106,786	23
Southeast New Mexico	18	15	4,512	0	3	1	0	14	3	0	60,316	53
Arkansas	16	8	1,661	0	8	0	0	6	10	0	86,443	17
North Louisiana	41	22	8,895	3	16	2	11	10	18	0	163,863	38
Louisiana Gulf	16	12	2,669	0	4	0	0	1	8	7	138,449	69
Mississippi	6	0	0	0	6	1	1	2	1	1	27,384	9
Montana	17	4	39	12	1	4	12	1	0	0	22,601	72
Wyoming	5	4	1,095	0	1	0	1	3	1	0	22,115	72
Colorado, Utah	3	2	321	0	1	0	2	0	1	0	9,590	34
Northwest New Mexico	5	2	170	1	2	1	4	0	0	0	8,051	13
California	95	65	8,814	0	30	10	34	39	12	0	281,028	121
Florida	2	0	0	0	2	0	0	2	0	0	7,866	3
Total December	1,454	803	141,757	157	494	63	570	594	214	13	4,618,901	2,310
Total November	1,353	765	126,539	152	436	79	519	545	196	14	4,111,751	2,242
Difference	101	38	15,218	5	58	16	51	49	18	1	507,150	68

Recent Completions Indicate Western Extension for Slaughter

MIDLAND, Tex. — Recent completions on the west side of the Slaughter pool of Cochran County indicate a spreading of production in that direction. On the western tip of production, J. A. Humphrey is just completing a well that on unofficial gages made better than 1,500 bbl. per day from a total depth of 5,052 ft. It is a south offset to a recent producer of Continental Oil Co. which on official potential test was good for 1,220 bbl. per day. These wells have gaged better than wells in the pool to the east, indicating better porosity in the lime pay. Humphrey has already made arrangements to drill 12 wells on his tract of 525 acres. The field is not defined in this direction, nearest dry hole being Honolulu 1 Carrie Slaughter-Dean, NE cor. of the W½, League 91, Lipscomb County School Land, which is 2½ miles farther west. It now seems very likely that the Slaughter pool and the Dean pool will ultimately join.

New locations in the West Texas district have been on the upswing, last week having 18 new tests reported, all but one of which were field wells. The Slaughter pool is the most active drilling area in the district, due to the drilling on the north end which continues to extend the pool with surprisingly good wells. Two miles north of the present producing area, Jerry Hawkins 14-B Mallett, SE SE Labor 23, League 46, Edwards County School Land Survey, which last week logged saturated lime from 4,849-4,900 ft., has not yet been tested, but indications were very favorable for production which would add over 3,000 acres to the already huge field. The same operator is drilling below 5,900 ft. on his 57-A Mallett, NW NW Labor 12, League 47, Edwards County School Land Survey, which passed saturation from 4,910-94 ft. and cased it off with 7-in. casing. Contract depth on this test is 6,500 ft., which should test the Tubb horizon of the Clear Fork lime.

The new pool opener in Gaines County, Shell 1 Leaverton, SW SW Section 458, Block G, C.C.S.D. & R.G.N.G. Survey, 4 miles southwest of the Wasson pool, was still testing. Last flowing gage reported was 17 bbl. fluid in 3 hours after which swabbing recovered 203 bbl. in 21 hours, 15 per cent of which was water. Total depth is 7,772 ft. in dolomite.

WEST TEXAS COMPLETIONS

Wildcats

Mitchell County: W. M. Fentress 1 D. L. Wulfjen, NW SW Sec. 5, Blk. 13, H.& T.C. Ry. Sur., elev. 2,163 ft., dry, T.D. 2,465 ft.

Pecos County: Continental Oil 1 J. H. Claybrook, NE SE Sec. 2, Blk. 50, T-9, T.&P. Ry. Sur., elev. 2,874 ft., Delaware lime 5,240 ft., Delaware sand 5,268 ft., S.G. 5,380 ft., dry, T.D. 5,461 ft., sand.

Magnolia 1 Allen Robertson, NW SW Sec. 16, Blk. 142, T.&St.L. Ry. Sur., elev. 2,685 ft., dry, T.D. 7,608 ft., lime.

Scurry County: Humble O. & R. 1 Newman, SE NE SW Sec. 258, Blk. 97, H.&T.C. Ry. Sur., elev. 2,501 ft., Ellenburger 8,175 ft., dry, lost tools, T.D. 8,336 ft.

Fields

Beddo, Runnels County: Art Tucker 1 Paul Witter, D. Diaz Sur., elev. 1,687 ft., Adams Branch lime 3,272 ft., Palo Pinto lime 3,492 ft., dry, T.D. 3,539 ft., lime.

Estes, Ward County: Westexas O. & R. 2-A State Univ., NE SE SE Sec. 4, Blk. 16, Univ. Sur., elev. 2,608 ft., dry, T.D. 2,709 ft.

Keystone-Colby, Winkler County: Tide Water 3 P. Pool, Sec. 28, Blk. B-3, Public School Lands, flowed 288 bbl., pay 3,225 ft., sand, shot 250 qt., T.D. 3,350 ft.

Noelke, Crockett County: Scott & Rife 1-B George Thompson, Sec. 58, Blk. GG, B. B. Ingham Sur., elev. 2,538 ft., flowed 5,142 bbl., pay 1,295 ft., sand, T.D. 1,305 ft.

Sand Hills, Crane County: Magnolia 18 P. J. Lea, Sec. 14, Blk. 32, Public School Lands, elec. 2,607 ft., flowed 254 bbl. on ¼-in. tubing, pay 4,300 ft., T.D. 3,610 ft., lime.

Slaughter, Cochran County: Continental Oil 11-58 Dean, Lge. 58, Martin County School Lands, flowed 1,571 ft., pay 4,925 ft., acid, T.D. 4,973 ft., lime.

J. C. Hawkins 41-A Mallet, Lab. 15, Lge. 47, Edwards County School Land, flowed 480 bbl. 32 gravity, pay 4,895 ft., lime, acid, T.D. 4,939 ft.

Honolulu Oil 2-C Mallet, Lab. 1, Lge. 52, Scurry County School Land, elev. 3,642 ft., flowed 276 bbl. 32 gravity, pay 5,004 ft., lime, acid, P.B., T.D. 5,039 ft.

Slaughter, Hockley County: E. Constantin, Jr. 1 Ted Smith-Orcutt, Lab. 11, Lge. 42, Rains County School Land, elev. 3,587 ft., flowed 337 bbl., pay 4,860 ft., lime, acid, T.D. 4,948 ft.

J. C. Hawkins 46-A Mallet, Lab. 14, Lge. 47, Edwards County School Land, flowed 359 bbl. 33 gravity, pay 4,911 ft., lime, T.D. 4,960 ft.

Magnolia Pet. 18-D Mallet, Lab. 9, Lge. 49, Edwards County School Land, flowed 1,285 bbl., pay 4,900 ft., lime, acid, T.D. 4,995 ft.

South Sealy, Ward County: Atlantic and Standard 2-B University, Sec. 12, Blk. 16, University Lands, elev. 2,640 ft., flowed 327 bbl. 28.4 gravity, plus 12 per cent water on ¼-in. tubing choke, pay 2,908 ft., lime, T.D. 2,912 ft.

Spencer, Ward County: Stanolind 1-C Mollie Spencer, Sec. 53, Blk. 34, H.&T.C. Ry. Sur., elev. 2,623 ft., dry, T.D. 3,000 ft., lime.

Taylor Link, Pecos County: David Breeding 3-11 University, Sec. 11, Blk. 18, University Sur., pumped 35 bbl. 30 gravity, plus 18 bbl. water, pay 1,571 ft., lime, acid 3,000 gal., T.D. 1,593 ft.

Toborg, Pecos County: Stanolind 8 Toborg, Sec. 539, A.&B. Sur., pumped 102 bbl. plus 14 per cent water, pay 341 ft., T.D. 375 ft.

Walker, Pecos County: Cardinal Oil 1-D University, Sec. 24, Blk. 16, University Sur., elev. 3,038 ft., flowed 44 bbl. 31.8 gravity, 26 bbl. water, pay 2,115 ft., lime, shot 80 qt., T.D. 2,136 ft.

West Fuhrman, Andrews County: Neville G. Penrose 3 University, Sec. 3, Blk. 10, University Sur., elev. 3,225 ft., flowed 132 bbl. 32 gravity, pay 4,440 ft., lime, T.D. 4,616 ft.

Wasson, Yoakum County: Drlg. & Explor. 3-A W. S. Knight, Sec. 773, Blk. D, J. H. Gibson Sur., elev. 3,725 ft., flowed 243 bbl. 32.8 gravity, pay 4,985 ft., lime, acid 9,000 gal., T.D. 5,248 ft.

White & Baker, Pecos County: Cardinal Oil 5-L White & Baker, Sec. 90, Blk. 194, G.C.&S.F. Ry. Sur., flowed 51 bbl. 32 gravity, pay 1,867 ft., shot 60 qt., T.D. 1,874 ft.

PANHANDLE COMPLETIONS

Carson County: Cities Service Gas 51-A Burnett, 2,475 ft. from N, 2,475 ft. from E lines, Sec. 58, Blk. 4, I.&G.N. Sur., elev. 3,238 ft., 3,000,000 cu. ft. gas, pay 2,399-2,754 ft., 11,000 gal. acid, lime, T.D. 2,754 ft.

Cities Service Gas 52-A Burnett, 150 ft. N and E of C Sec. 75, Blk. 4, I.&G.N. Ry. Sur., elev. 3,232 ft., 9,000,000 cu. ft. gas, pay 2,300-2,623 ft., dolomite, acid 4,500 gal., T.D. 2,650 ft.

Gray County: Phillips Pet. 1 Boone, Blk. B-2, H.&G.N. Sur., elev. 3,277 ft., 8,000,000 cu. ft. gas, pay 2,700-2,915 ft. lime, T.D. 2,961 ft.

Phillips Pet. 1 Wills, Sec. 191, Blk. B-2, H.&G.N. Ry. Sur., elev. 3,290 ft., 36,000,000 cu. ft. gas, pay 2,767-2,859 ft., brown dolomite, acid 5,000 gal., T.D. 2,890 ft.

Hutchinson County: F. J. Crosbie, Inc. 52 Pitts, Sec. 9, Blk. M-21, T.C. Ry. Sur., elev. 2,834 ft., pumped 150 bbl., pay 2,725 ft., dolomite, T.D. 2,825 ft.

Moore County: Phillips Pet. 1 O. F. Gober, Sec. 10, Blk. 1, J. Poitevent Sur., 23,000,000 cu. ft. gas, pay 2,590-2,824 ft., dolomite and lime, acid 5,000 gal., T.D. 2,960 ft.

New Pay Opened in Jackson Field, Eddy County

HOBBS, N. M.—A new sand for the Jackson field, Eddy County, was opened by Skelly 3-B Dow, 21-17-35, which flowed 455 bbl. natural between 2,950 and 3,555 ft. The lower part of this section is in the new pay.

In southeast Lea County, Olsen and Atlantic's deep wildcat is shut down in the Simpson at 8,524 ft. awaiting a decision whether or not to go on to the Ellenburger. Top of the Simpson was reported at 8,255 ft.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcats

Roosevelt County: Malco Refining 1 Bilberry, SE SW Sec. 1-7s-37e, elev. 4,022 ft., San Andres 3,538 ft., oil stain 4,185-4,268 ft., Glorietta sand 4,830 ft., dry, T.D. 5,268 ft., limt.

Fields

Artesia, Eddy County: Payton Bros. 7-A Russell, SE SW SE Sec. 25-17s-27e, pumped 200 bbl., pay 450 ft., T.D. 477 ft., lime.

Jackson-Grayburg, Eddy County: Skelly Oil 1-B Lynch, SE NE Sec. 27-17s-31e, elev. 3,821 ft., dry, T.D. 4,377 ft., lime.

Maljamar, Lea County: Johney Cockburn 8-B Miller, NE SE Sec. 25-17s-32e, elev. 4,028 ft., flowed 731 bbl., pay 4,132 ft., lime, shot 200 qt., T.D. 4,200 ft.

Russell, Eddy County: Dr. George Turner 2 Wills, NE SW Sec. 31-20s-28e, elev. 3,249 ft., pumped 36 bbl., pay 814 ft., lime, P.B. to 858 ft., T.D. 873 ft.

West Eunice, Lea County: Tex. Pac. Coal & Oil 24-A Acct. 2 State, NE SE Sec. 8-22s-36e, flowed 72 bbl., 11/64-in. choke, pay 3,727 ft., lime, acid 3,000 gal., T.D. 3,889 ft.

APPALACHIAN FIELDS

New Deep Test Staked on Chestnut Anticline

PITTSBURGH, Pa.—In Derry Township, Westmoreland County, Peoples Natural Gas Co. has made a location for a deep test on the Camilla F. Giffin farm located on the New Florence quadrangle ½ mile east of 79° 15′ and 0.38 mile north of 40° 20′. It is on Chestnut (Preston) anticline with a starting elevation of 2,352 ft. and should reach the Oriskany this week.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Armstrong County, Bethel Township: Apollo Gas Co. 2 John Wareham, 162,000 cu. ft. gas; Speechley sand 2,708-37 ft., gas 2,711 ft., Tiona 2,943-63 ft., gas 2,945 ft., T.D. 2,970 ft.

Manor Township: Local Co. 2 H. F. Eiseman, 178,000 cu. ft. gas, Murraysville and Hundred-foot, T.D. 1,511 ft.

Clarion County, Monroe Township: Frank Shreffler et al 2 E. L. Phillips, 70,000 cu. ft. gas, Speechley sand, T.D. 2,538 ft.

Greene County, Monongahela Township: L. J. Houze Convex Glass Co. 1 Gantz Ross, dry through Fifth sand, T.D. 2,560 ft.

Washington County, Amwell Township: Peoples Natural Gas Co. 1 Walter E. Redd, drilled deeper, Fifth sand 3,040-65 ft., gas gaging 140,000 cu. ft. at 3,044 ft., T.D. 3,065 ft.

Somerset Township: Equitable Gas Co. 3283 John Andrusek, 231,000 cu. ft. gas, Little Dunkard 885-929 ft., gas sand 1,287-1,341 ft., gas 1,304-07 ft., Salt sand 1,435 ft., gas 1,477 ft., T.D. 1,480 ft.

Westmoreland County, Bell Township: Peoples Natural Gas Co. 1 H. C. Hicks Coal Co., 2,470,000 cu. ft. gas, Thirty-foot sand 1,379 ft., gas 1,410 ft., T.D. 1,414 ft.

Peoples Natural Gas Co. 1 Glass Bros., 42,000 cu. ft. gas, through Bradford sand, T.D. 3,654 ft.

WEST VIRGINIA

Another important piece of geological information is added with the top of the Corniferous lime in the Columbian Carbon Co.'s deep test on the Rowland Land Co. in Marsh Fork district, Raleigh County. It was placed at 5,918 ft. with a surface elevation of 1,422 ft., making it 4,496 ft. subsea.

In Union district, Mason County, Godfrey L. Cabot, Inc., is drilling the deep test on the Daniel Matheney farm at 5,634 ft. and passed through the Clinton sand at 5,495-5,518 ft., which was void. The Big Six was placed at 5,121-92 ft. with the bottom of the Silurian lime section at 5,199 ft.

In Browns Creek district, McDowell County, Godfrey L. Cabot, Inc., is drilling at 2,871 ft. in the second test on the John Gilbert et al lease with the Big lime topped at 2,636 ft.

In Union district, Pleasants County, the important test of J. C. Benedum on the W. W. Campbell farm is drilling in the Corniferous lime at 5,535 ft. and should reach the Oriskany this week.

Braxton County, Salt Lick district: West Virginia Gas Corp. 1 T. L. Skinner et al, 44,730 cu. ft. gas, through Injun sand, T.D. 2,712 ft.

Clay County, Buffalo district: Pittsburgh & West Virginia Gas Co. 7895 Elk River C. & L. Co., 219,000 cu. ft. gas, Big lime 1,883-1,960 ft., Injun 1,960-2,078 ft., T.D. 2,099 ft.

Putnam County, Curry district: Reishman Oil & Gas Co. 1 Pike heirs, 313,000 cu. ft. gas, Big lime 1,674 ft., Injun 1,865 ft., Berea 2,347 ft., T.D. 4,476 ft.

Teays Valley district: Teavee Oil & Gas Co. 1 Meadow heirs, 2,613,000 cu. ft. gas, Big lime 1,412 ft., Big Injun 1,555 ft., T.D. 1,586 ft.

Union district: Guy B. Ray 1 fee, 9,000 cu. ft. gas, brown shale, R.P. 150 lb., T.D. 4,000 ft.

Ritchie County, Murphy district: W. H. Bickel 3 B. F. Welch, dry through Injun sand, T.D. 2,093 ft.

Wetzel County, Grant district: Pittsburgh & West Virginia Gas Co. 5427 Nampeco Corp., 168,000 cu. ft. gas, Big lime 2,178 ft., Injun 2,230 ft., gas 3,092-3,095 ft., T.D. 3,235 ft.

ORISKANY GAS FIELDS

Jackson County, Washington district: Columbian Carbon Co. 680 J. C. Patterson, 862,000 cu. ft. gas which blew down to 189,000 cu. ft., Oriskany 5,077-5,137 ft., lime break 5,137-39 ft., Oriskany 5,139-53 ft., shot 5,079-5,144 ft., T.D. 5,175 ft.

Putnam County, Union district: Godfrey L. Cabot, Inc., 1074 Putnam Co., 174,000 cu. ft. gas, Oriskany 5,010 ft., salt water 5,074-76 ft., plugged off, shot 5,024-44 ft., T.D. 5,086 ft.

MICHIGAN

Aetna Extension Test Makes Better Flow Than Discovery

SAGINAW, Mich.—Missaukee County's oil-producing potential soared last week as Gordon Oil Co. brought in the 2 Reames in Section 26 of Aetna Township for an initial daily flow of 954 bbl. naturally. Regarded as one of the best prospects in months, the producer is ½ mile west of the discovery well, which averaged under 100 bbl. a day its first month. Considerable early development is in prospect. Gulf Refining Co. has moved rotary-drilling equipment to a location south of the gusher. Several big operating companies as well as several independents control acreage in the vicinity.

Gordon's gusher concentrated more interest on Missaukee County, which assumed new importance in recent weeks as a result of the Sun Oil Co. activities in Enterprise Township, to the northwest, resulting in a possible new field in the Dundee. Flowing and swabbing it is yielding better than 100 bbl. a day from the Sun A-State in Enterprise, Section 11. The Gordon gusher was completed at 3,821 ft.

While Michigan oil production in December fell short of the federal quota, it held fairly steady, averaging only 102 bbl. a day less than in November. December output was estimated at 1,866,293 bbl. of crude, the Oil and Gas Association of Michigan figures revealing the extra day last month resulted in production of 57,143 bbl. more than in November when daily production averaged 60,305 bbl., compared with 60,203 bbl. last month.

P. J. Hoffmaster, state conservation director, announced that Michigan's oil quota for February has been fixed at 63,700 bbl., the same as for the current month. Although recent activities have improved production outlook, Hoffmaster said he doubted whether the goal will be reached. He pointed out that oil men of the state will gather in Lansing January 27 for a hearing to consider proration and a decision whether to put the two new Missaukee County producing areas under production limits.

In averaging 60,203 bbl. a day last month from 3,186 producing wells in all fields, production was practically constant with the usual more than 40 per cent coming from the 174 wells in the Reed City field. Reed City's daily average was 27,119 bbl. In second place was the Roscommon-Headquarters field at 7,100 bbl. The average was between 2,900 and 3,000 bbl. in the Adams-Arenac and Midland-Porter-Yost fields and slightly less in Winterfield-Clare. While the once leading Freeman-Redding field in Clare County declined slightly again, the slowly growing Bay County field improved a little, its daily average passing Porter-Yost at 1,751 bbl. to rank it eighth in the state.

Fisher-McCall Oil & Gas Co. took out permits to drill two tests in Section 9 of Bangor Township, Van Buren County. Sun Oil Co. prepared for another test in Enterprise Township, Missaukee County, and Continental Oil Co. of Ponca City, Okla., arranged for a wildcat test in Section 10 of Al-

bion Township, Calhoun County.

In addition to the oil hearing in Lansing this week, two other events are scheduled there. The Michigan Geological Society will also meet January 27 and an auction of oil and gas leases on state-owned lands was set for January 28 and 29. Third biggest offering, state lands-division officials reported 72,000 acres were being offered in the hope of speeding exploration and the prospects of new fields. Much of the area is in northern Michigan.

MICHIGAN COMPLETIONS

Allegan County, Dorr Township: Muskegon Oil Corp. et al 1 Podurgiel, SE 29-4n-12w, 95 bbl. first 18 hr., acidized, T.D. 1,664 ft.

Isabella County, Broomfield Township: L. & S Drilling Co. 1 Leach, NW SE SE 24-14n-6w, 186,000 cu. ft. natural gas, T.D. 1,352 ft.

Mecosta County, Fork Township: Sun Oil Co. 3 Murray et al, C S½ SE SW 5-16n-7w, 350 bbl., acidized, T.D. 3,818 ft.

Missaukee County, Aetna Township: Gordon Oil Co. 1 Reames, C S½ SE SW 26-22n-6w, 954 bbl., natural, T.D. 3,821 ft.

Osceola County, Osceola Township: Sun Oil Co. 1 Becker et al, C N½ NW NW 27-18n-8w, flowing 308 bbl., acidized, T.D. 3,754 ft.

Ottawa County, Zeeland Township: Clifton A. Perry 1 Prins-Nykamp, SE SE NE 31-5n-14w, dry, T.D. 1,788 ft.

Roscommon County, Roscommon Township: Mogul Oil Co. A-2 State, C N½ NE SE 34-21n-3w, pumping 25 bbl. and salt water, naturally, T.D. 3,430 ft.

Van Buren County, Bloomingdale Township: C. C. Goff 1 Sage, C SW NW 13-1s-14w, pumping 10 bbl., acidized, T.D. 1,344 ft., P.B. to 1,304 ft.

ROCKY MOUNTAIN AREA

Operators Consider Possibility Of Supplying Pacific Northwest

DENVER, Colo. — Oil men in the Rocky Mountain area are watching with hopeful eyes the progress of federal agencies, leaders in the industry, and others in their efforts to relieve the shortage of petroleum products in the East. This interest arises from the fact that an analogous situation exists in the Pacific Northwest. Montana, Wyoming and Colorado are situated in relation to that territory approximately the same as the Mid-Continent and Texas are related to the East. The problems are much the same and the remedies that serve the difficulties of one area might apply with equal force to the other. The producers and refiners here are hopeful that they will not be slighted in the efforts to bring about a satisfactory adjustment.

A well-known oil man, who desires to remain anonymous, points out that the Rocky Mountain states have been called upon to relieve the shortage of petroleum products in Washington and Oregon to their utmost capacity. This is due in part to the developing shortage in California which formerly supplied that territory, and partly to the increasing importance of the Northwest area in the war effort, particularly Alaska and the opening up of the Alcan Highway. In the West, as well as in the East, transportation is one of the most difficult problems. That does not mean that aid to producers in this area in the way of ample oil-field equipment, supplies, and facilities to increase production to meet the greater demand is less important. More oil must be produced to meet the demand and facilities must be provided to move it to the places where it is needed.

The steps being taken to relieve the eastern situation are well known. Tank cars are being diverted to that purpose. The Government has spent large sums in the past in providing river and canal facilities in competition with railroad transportation. It is financing the construction of a big pipe line to the East and has plans under way for additional facilities of a like nature. Freight-transportation rates have been reduced in some instances by 50 per cent through the Government absorbing the differential. Canal barges are being constructed with governmental aid and the Washington agencies and the industry are working together in every way possible in their efforts to relieve the situation.

The western oil men express the opinion that the efforts to supply the Pacific Northwest should be as vigorously pressed here as in the East and that aid should be granted by the federal Government in equal proportions. The subject of a pipe line from the Rocky Mountain states to the Northwest already is being given consideration, but before such a project can be consumated valuable time will be wasted. Pipe-line construction through mountainous territory takes more time and encounters greater difficulties than in the East, and while such an undertaking is urgently desirable, a quicker solution must fill in the gap. The mountain states are isolated as far as transportation facilities are concerned except for the railroads. There is no water transportation to offer competition and rates, accordingly, are high. The railroads, also, operate through mountainous territory, which increases their cost in comparison with prairie lines, and it is doubtful if they can afford any substantial relief in transportation costs. If the mountain states and the Pacific Northwest are fitted into the picture as a whole and such remedies as are being applied in the East are granted in this territory, the industry can be counted upon to make every effort to furnish the much-needed products. There are large quantities of proven black-oil reserves in this territory and it is urgently required elsewhere for the war effort. Equal consideration and proportionate aid is all that the oil men request.

Freakish weather conditions played havoc with drilling progress the past week, many wells being compelled to shut down temporarily and others have ceased operations for the winter. Chinook winds raised the temperature to summer heights and were followed by blizzards which sent it to varying degrees below zero. In spite of these facts, 17 new operations were reported, 9 of which were in the Cut Bank field, 3 in Oregon basin, 2 in Elk basin 2 in the Bowdoin gas field, and 1 in Lance Creek.

One of the Elk basin operations is Minnelusa Oil Corp. 2 Henderson, NE NW NE 31-58n-99w, approximately ½ mile west of 1 Henderson, its recent discovery in the Tensleep which flowed 80 bbl. an hour.

Continental Oil Co. 1 Coltharpe, C SE NW 18-51n-66w, in the Moorcroft district, northeastern Wyoming, tested all possible horizons down to 3,610 ft. and then began plugging back and testing various horizons before abandoning.

Some relief in the black-oil price situation was granted the past week when OPA established a maximum of 75 cents per barrel for Wyoming heavy (No. 6) fuel oil, as against 65 cents, the figure which represented the average of all sales in 1941. Most of the oil sold in that year, however, was delivered under unadjustable contracts and did not reflect present market conditions.

WYOMING COMPLETIONS

Lance Creek, Niobrara County: Continental Oil Co. 6 Rodeo-1, SE SE SE 27-36n-65w, T.D. 5,534 ft., 6⅝-in. 5,386 ft., swabbed 10 bbl. a day after acidizing.

Newcastle, Weston County: John Brorphy 1 Hansen, NW NE NW 13-44n-63w, T.D. 3,566 ft., plugged and abandoned after testing Dakota series, Muddy sand at 3,120-95 ft.

Oregon basin, Park County: Ohio Oil Co. 4 Custer Petroleum, NE SE SE 32-52n-100w, T.D. 3,781 ft., flowed 406 bbl. per day from the Embar after acidizing.

MONTANA COMPLETIONS

Bowdoin, Phillips County: Montana-Dakota Utilities No. 693, C SW 16-32n-32e, T.D. 1,065 ft., Bowdion sand 735-791 ft., Phillips sand 920-1,065 ft., 5½-in. 726 ft., 4½-in. perf. liner o nbottom, 814,00 cu. ft., 302 lb. pressure.

Montana-Dakota No. 685, C SW 21-32n-33e, T.D. 1,006 ft., Bowdoin 700-754, Phillips 866-960, 5½-in. 705 ft., 4½-in. perf.

(Continued on Page 216)

N. CENTRAL TEXAS

Simpson Production Extended At Walnut Bend

WICHITA FALLS, Tex. — Sinclair Prairie 1 Winger, NW cor. Section 70, Fannin County School Land Survey, east extension to Walnut Bend pool, flowed 880 bbl. per day through perforations at 5,491-5,533 ft. opposite Simpson sand, upper Ordovician age. This extends the Simpson producing area almost 2 miles due east, and already two locations have been staked, one south and one west of the extension. There seems to be some disagreement about the pay being Simpson sand, and some geologists are inclined to call it Strawn.

In Young County, machinery was being moved to location for Anderson-Prichard and Darby Oil 1 Mooney, just north of the Stephens County line, 8 miles west of Eliasville. Projected depth of the wildcat is 4,800 ft. North of the Knox pool, Rankin & Elliott 1 Mrs. E. Taylor encountered a hole full of water from 4,353-80 ft. and was plugged back and perforated with 24 shots from 4,360-68 ft. and acidized with 5,000 gal. and swabbed 5 bbl. It will be reacidized.

In Jack County, Gibtown area, Joe Worsham 1-A Meador, Lot 22, Block 1, Henderson County School Land, missed the pay that showed in the first well in which tools were blown up the hole and consequently lost at a total depth of 5,277 ft., and was drilling below 5,500 ft. at last report. Shell Oil Co., Inc. 1 Wolfe, east of Jermyn, in Section 3341, T.E.&L. Survey, had drilled to 5,224 ft. in shale. Youngblood & Foree 1 Cherryhomes, east of Jacksboro, Section 3, G.&B.N. Survey, was drilling in hard, dry dolomite lime at 6,620 ft. Gwynn & Overby had moved rotary rig in on location of 1 Kinder, 8 miles south of Jacksboro, and were rigging up to carry the hole from 565 ft. where it was drilled with spudder.

In the Stoneburg pool of Montague County, Continental 1 Hurd, Lot 4, Limestone County School Land Survey, swabbed 150 bbl. oil after reacidizing with 5,000 gal. in the conglomerate at 6,052-96 ft. The well is a south offset to the discovery.

The well started by Snoddy Brothers northwest of the Padgitt pool on the A. Furr farm, Section 330, T.E.&L. Survey, has been taken over by Grace & Grace and will be drilled to 6,000 ft. to test the Mississippi lime.

NORTH CENTRAL TEXAS COMPLETIONS

Wildcats

Archer County: W. H. Peckham 1 L. W. McCrory, Lot 101, A.T.N.C.L. subd., dry, T.D. 1,555 ft.

W. C. Young 1 F. C. Green, Blk. 1, Wm. Ainsworth Sur. A-1, dry, T.D. 1,225 ft.

Wichita County: Staley Oil 1 C. Moeller, Blk. 290, Wichita County School Land Sur., dry, T.D. 2,053 ft.

C. C. Winfrey 1 J. N. George, Sec. 1, S.A. &M.G. Sur., dry, T.D. 760 ft.

Fields

Allar-Hunt, Young County: Panhandle Refining 6 Allar Co., Sec. 3409, T.E.&L. Sur., flowed 220 bbl., pay 2,751 ft., T.D. 2,757 ft., sand.

Burkburnett shallow, Wichita County: Akin & Dimmock 9 E. E. Hardin, O. Farish Sur. A-383, dry, T.D. 1,352 ft.

Electra, Wichita County: W. H. Peckham 1 N. H. Martin, Sec. 12, B.S.&F. Sur. A-744, dry, T.D. 1,838 ft.

Petroleum Inv. Co. 5 L. P. Douglas A, Sec. 15, H.&G.N. Sur. A-449, pumped 11 bbl. pay 1,678 ft., T.D. 1,685 ft., sand.

K.M.A., Wichita County: W. H. Hammon 19 fee, Sec. 3, E.T.R.R. Sur. A-763, flowed 493 bbl., pay 4,001 ft., shot 90 qt., T.D. 4,041 ft.

K.M.A.-Ellenburger, Wichita County: E. C. Oil Co. 35-E Anna Mangold, Lot 33, P. Castleman Sur. A-35, dry, T.D. 4,434 ft., lime.

Megargel, Archer County: C. W. Clark 1 V. W. Kunkel, Lot 12, Crawford subd., dry, T.D. 1,306 ft.

Ross, Clay County: Continental and Superior 2 O. O. Ross Jr., A, O.W.D.D., J. Wyont Sur., pumped 130 bbl., pay 5,465 ft., lime, T.D. 5,559 ft.

Swastika, Archer County: Glover et al 1 J. T. Richardson, Lot 1, M.E.P.&P. Sur. A-715, dry, T.D. 1,342 ft.

Glover et al 2 J. T. Richardson, Lot 1, M.E.P.&P. Sur., A-715, dry, T.D. 1,262 ft.

Thornberry, Clay County: Fortex Oil 2 Harrison & Allen, J. Duncan Sur. A-112,

(Continued on Next Page)

EASTERN TEXAS FIELDS

Nacogdoches County Distillate Discovery to Acidize

DALLAS, Tex. — Texas Co. 1 Strahan, gas-distillate discovery from the Travis Peak formation in northeastern Nacogdoches County, will treat with acid in an effort to increase the flow of distillate. All previous perforations had been squeezed off and the casing was reperforated with 150 shots from 8,610-60 ft., after which the well flowed an estimated 50 bbl. of straw-colored distillate and 10,000,000 cu. ft. of gas on ¼-in. choke set on packer, with 850 lb. pressure.

Possible failure for the Chapel Hill Pettit pay in Smith County was Sinclair Prairie Oil Co. 2 Edna B. Smith, S. M. Hyde Survey, an east offset to a Pettit producer making 237 bbl. from pay at 8,132-8,360 ft. The well ran low on structure, and showed formation water on test of the first zone of porosity from 8,205-40 ft. The operator plans to squeeze perforations and reperforate in the two lower porous zones.

In the Quitman pool of Wood County, Shell 1 Goldsmith, south offset to the discovery, topped the Paluxy at 6,226 ft., cored 6,224-27 ft., recovered 2½ ft., no shows reported, and was coring ahead. New wildcat for Wood County is Bobby Manziel 1 W. F. Bailey estate, SE cor. 120-acre tract out of the Samuel Burch Survey, 5 miles south of the Coke pool and 6 miles northwest of the Quitman pool. Acreage was obtained from Shell, and the test is supported by several majors owning acreage in the vicinity. Northeast of Quitman, Danciger Oil & Refining Co. is working on titles preparatory to staking location on its block centering around the S. W. Mitchell Survey.

EAST TEXAS COMPLETIONS

Wildcats

Angelina County: K. L. McHenry 1 Long Bell Lumber Co., P Mullins Sur., elev. 238 ft., Wilcox 1,746 ft., Midway 5,015 ft., dry, T.D. 5,504 ft., shale.

Kaufman County: Elbert Williams 1 Berryman, E. Higdon Sur., elev. 329 ft., Pecan Gap chalk 1,375 ft., Austin chalk 2,100 ft., base Austin 2,601 ft., Woodbine 2,974 ft., Woodbine sand 2,992 ft., dry, T.D. 3,026 ft.

Rains County: H. L. Hunt 1 J. H. Sparks, Wm. Rice Sur., elev. 541 ft., Pecan Gap 2,627-3,170 ft., Austin 3,510 ft., sub-Clarksville 3,546 ft., Woodbine 4,060-90 ft., dry, T.D. 6,214 ft.

Van Zandt County: Oscar Donley 1 A. L. Clark, J. A. Parker Sur., Pecan Gap 2,832 ft., Woodbine sand 4,740 ft., dry, T.D. 4,795 ft.

Smith County: Iowa Payne Oil 1 A. Murray, T. Quevedo Sur., elev. 512 ft., Pecan 3,930 ft., dry, T.D. 5,825 ft., shale.

B. F. Phillips 1 V. P. Kay, Oscar Hawkins Sur., elev. 396 ft., dry, T.D. 5,812 ft.

Fields

Kildare, Cass County: C. C. Gilger 3 Cass County, 1,960 ft. from S, 660 ft. from W lines, J. M. Watson Sur., elev. 321 ft., flowed 562 bbl., ¼-in. choke, pay 5,992-6,005 ft., perf. 48 shots, T.D. 6,032 ft.

Chapel Hill, Smith County: Shell-Sun 1 J. W. Bacon, O.W.W.O., P.B. from 8,112 ft., flowed 168 bbl. 44.8-gravity, pay 7,332-7,438 ft.

Hawkins, Wood County: Humble Oil & Ref. 1-B Minshaw, Joel B. Crain Sur., elev. 385 ft., flowed 372 bbl. 36.5-gravity, pay 4,686-94 ft., 4,810-27 ft., T.D. 4,835 ft.

OIL KEEPS 'EM "FLYING!"

When you see one of Uncle Sam's tough little scout cars literally "take to the air," you wonder how these machines and engines stand up under such terrific punishment and keep right on running at maximum efficiency.

The answer lies in new engine design, based on research in petroleum refining methods. *Engines* are better, tougher, because *oils* are better and tougher.

The oil industry is vital in helping our Armed Forces to Victory. We stand ready to serve in financing any phase of the oil business.

THE FIRST NATIONAL BANK
THE FORT WORTH NATIONAL BANK
CONTINENTAL NATIONAL BANK
OF FORT WORTH

pumped 25 bbl., pay 1,112 ft., sand, T.D. 1,140 ft.

Kimbell & Boner 1 D. Summers, Blk. 2, W. Wyatt subd., dry, T.D. 1,211 ft.

Webb-Taylor Drlg. 1 J. Schaffner, Byers Bros. subd., dry, T.D. 1,165 ft.

Walnut Bend, Cooke County: Sinclair Prairie 1 W. E. Winger, Sec. 70, Fannin County School Land, flowed 880 bbl., perf. 5,491-5,533 ft., sand, T.D. 5,557 ft.

Watson, Clay County: Whitaker Oil 4 Mrs. L. M. Newton, Sec. 2673, T.E.&L. Sur., flowed 93 bbl., pay 5,502 ft. lime, acid 3,000 gal., T.D. 5,518 ft.

Activity Increasing in Jones and Taylor Counties

FORT WORTH, Tex.—Work in the West Central Texas area has been lagging for the past few months, but indications are that there will be a rapid pickup, especially in Jones and Taylor counties, where several interesting wildcats are in the mill. North of the Wimberly pool, Fain & McGaha et al are to drill a Swastika sand test, NW NE Section 20, Block 17, T.&P. Ry. Survey, on the Patterson farm, to 2,600 ft. South of the South Noodle pool, Humble has staked location for 1 J. M. Williams, NW SW Section 31, Block 18, T.&P. Ry. Survey, a ½-mile outpost. Fain & McGaha have blocked acreage in the old Noodle Creek area, southwest Jones, and will probably announce a location in the near future.

Northwest definition for the Wimberly pool was Fain-McGaha 1 Varner, Lot 89, League 126, De Witt County School Land, which was dry and abandoned at a total depth of 2,350 ft. The one-well Grogan pool also had a disappointment when Lewis Production et al 1 Hall was a failure at 2,287 ft.

Mills County got a new wildcat location last week when Albert P. Groebl announced his 1 Fairman would be drilled in C SE NE Section 13, H.T.&B. Survey, to a depth of 3,000 ft.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Eastland County: Kwough & Ench 1 H. A. Bible, SE Sec. 12, Blk. 2, B.B.B.&C. Ry. Sur., elev. 1,734 ft., Caddo lime 3,110 ft., Ellenburger lime 4,050 ft., dry, T.D. 4,151 ft.

Stephens County: Daniel Prod. 2 Pratt Est., C NW Sec. 1294, T.E.&L. Sur., dry, T.D. 3,331 ft.

Akard, Jones: Tex. Pac. Coal & Oil 2 Stokes, Sec. 137, G. Martinez Sur., flowed 116 bbl. pay 2,124 ft., sand, T.D. 2,136 ft.

Morris, Coleman County: Anzac Oil 42 Morris, G. H. McNeil Sur., dry, T.D. 2,695 ft.

Grogan, Jones County: Lewis Prod. et al 1 H. C. Hall, Jr., SW NW NW Sec. 1, Blk. 17, T.&P. Ry Sur., dry, T.D. 2,287 ft.

Smith-Morgan, Comanche County: J. C. Hamer 5 Smith, Sec. 31, B.B.B.&C. Sur., pumped 12 bbl., pay 7,281 ft.

Stith, Jones County: Danciger Oil & Ref. 2 A. J. Cannon, NE SW Lot 81, Lge. 126, De Witt County School Land, dry, T.D. 2,731 ft.

Strawn, Palo Pinto County: Tex. Pac. Coal & Oil 1 fee-Ryan, Isaac Ryan Sur., dry, T.D. 3,055 ft.

Wimberly, Jones County: Fain-McGaha 1-A Varner, Blk. 89, Lge. 126, De Witt County School Land, dry, T.D. 2,350 ft.

E. L. Wilson et al 3 Mashburn, SE SE Lot 85, Blk. 126, De Witt County School Land, flowed 756 bbl., pay 2,313-35 ft., lime, T.D. 2,410 ft.

ILLINOIS FIELD REPORT

Well in Patoka Field Has Large Flow From Devonian

MATTOON, Ill.—The Adams Oil & Gas Co. 10 Pugh, the first Devonian producer in the Patoka field of Marion County, is showing for about 400 bbl. of oil daily. The well at present is shut in for bottom-hole pressure after a recent gage of 20 bbl. of fluid per hour, 20 per cent of which was water. Another Devonian test under way in the pool, the Shell Oil Co. 1 Sugg heirs, NE NW NE 14-3n-1e, is drilling below 2,400 ft. with no shows of commercial saturation to that depth.

A south offset to the discovery well of the Bartelso South pool, Texas 1 H. Suhl, SE NE 20-1n-3w, cored promising Devonian saturation last week and set casing to 2,472 ft. Fair porosity and good indications of oil were encountered in the cores. A commercial completion at the 1 Suhl would definitely prove the existence of a Devonian pool in the area.

Pumping equipment is being installed at Burr Lambert's pool opener, the 1 Nellie Van Schoick, NW SE NW 18-1n-10e, Edwards County, 6 miles west of the Parkersburg pool. The prospects of the well showing up were a little doubtful for a while due to the pipe being set too low in the hole, but the well swabbed at the rate of 9 bbl. of oil an hour after a 30-qt. shot in the Aux Vases sand at 3,140-69 ft.

The National Refining Co. 1 P. Hill, W½ SW SE 29-2s-9e, at last reports was being put on pump to test the McClosky limestone topped at 3,293 ft. The well was drilled in with rotary tools and no acid treatment has been given the well. No gage is available but operators in the area estimate the well will be good for about 300 bbl. of oil daily when completed. The completion of the 1 Hill will extend the Golden Gate pool ½ mile to the east.

In the pool south of the State Game Farm, Nash Redwine 1 E. M. Randolph, SW SW SW 27-3s-3e, continued to flow by heads during the week end from the Aux Vases sand and production is now estimated at 800 bbl. daily, and possibly even 1,000 bbl. Operators are now running tubing and rods for a pump test and an accurate gage should be released within the next few days.

Redwine's offset to the 1 Randolph, the 2 Randolph, NW 34-3s-3e, completed a fishing job at the end of the week and was scheduled to core the Aux Vases.

In Wabash County near the Friendsville field and approximately ½ mile southwest of the nearest sand producer, Magnolia Petroleum Co. has encountered a show of oil in the Levias at the 1 Amy Newkirk, NE NW NE 34-1n-13w. On a 1-hour drill-stem test, there was a recovery of approximately 2,000 ft. of oil and oil-cut mud from the Levias pay. The formation was topped at 2,620 ft. and casing has been run to the bottom, 2,658 ft.

ILLINOIS COMPLETIONS

Wildcats

Coles County: W. L. Topf 1 Ralph Chambers, NW NW NW 28-14n-10e, dry at 495 ft.

Effingham County: H. H. Weinert 1 William Berry, NW NE SW 34-8n-5e, dry at 2,385 ft., Glen Dean 1,873 ft., Cypress sand 2,028 ft., Paint Creek 2,160 ft., Benoist sand 2,192 ft., Aux Vases sand 2,251 ft., Ste. Genevieve 2,281 ft.

Jasper County: Pure 1 Kincaid, E½ SE NE 13-5n-9e, dry at 2,950 ft., Glen Dean 2,383 ft., Weiler 2,568 ft., Aux Vases sand 2,825 ft., Ste. Genevieve 2,882 ft., McClosky 2,929 ft.

Madison County: J. Kisl 1 Gargac, NE SE 12-3n-9w, dry at 1,370 ft., St. Louis 470 ft., Devonian 1,262 ft.

Perry County: Stanolind 1 J. H. Jackson, NW NW SE 2-5s-1w, dry at 1,755 ft., Waltersburg 870 ft., Tar Springs 915 ft., Glen Dean 1,025 ft., Hardinsburg 1,060 ft., Weiler 1,243 ft., Paint Creek 1,405 ft., Benoist 1,425 ft., Aux Vases sand 1,483 ft., Ste. Genevieve 1,545 ft.

Wayne County: George Echols 1 Goodwin, W½ NW SW 10-1s-7e, dry at 3,303 ft., Tar Springs sand 2,509 ft., Glen Dean 2,634 ft., Paint Creek sand 2,940 ft., Bethel 3,010 ft., Aux Vases sand 3,126 ft.

Fields

Allendale, Wabash County: C. Keneipp 1 T. Price, NE NE SW 14-1n-12w, dry at 1,664 ft., Tar Springs sand 1,660 ft.

Benton, Franklin County: Shell 11 C. W. & F. Coal, NE NW SE 24-6s-2e, pumped 30 bbl., shot 2,121-27 ft., Tar Springs sand 2,108 ft., pay 2,113-27 ft., T.D. 2,127 ft.

Bible Grove, Clay County: Texas 4 W. G. Landwehr, SE SE NE 8-5n-7e, pumped 60 bbl., Weiler 2,521-23 ft., T.D. 2,534 ft.

Texas 4 M. Bloemker, SE NW NE 4-5n-7e, pumped 49 bbl. in 10 hr., natural, Cypress sand 2,504 ft., T.D. 2,521 ft.

Texas 5 W. G. Landwehr, SE SW NW 9-5n-7e, pumped 100 bbl., natural, Cypress sand 2,484-90 ft., Weiler 2,526-38 ft., T.D. 2,540 ft.

Dale, Hamilton County: Pure 1-A Guye St. Clair, SE NW SW 18-6s-7e, dry at 3,251 ft., Tar Springs 2,437 ft., Glen Dean 2,495 ft., Hardinsburg 2,605 ft., Weiler 2,814 ft., Paint Creek 2,988 ft., Aux Vases sand 3,108 ft., Ste. Genevieve 3,133 ft.

Friendsville, Wabash County: Magnolia 2 Sturman, NW NE NE 10-1s-13w, pumped 1 bbl. oil and 2 bbl. water, shot 2,489-2,497 ft., Weiler 2,483-85 ft., T.D. 2,497 ft.

Halbert et al 1 Ramsey, NW SW SW 2-1s-13w, dry at 2,659 ft., Cypress sand 2,285 ft., Weiler 2,308 ft., Benoist sand 2,420 ft., McClosky 2,611 ft.

Sinclair 2 E. Majors, SW SW NW 2-1s-13w, dry at 2,450 ft., Weiler 2,326 ft.

Iola, Clay County: Tide Water 1 Davis, NW SW NE 15-5n-5e, pumped 201 bbl., natural, Aux Vases sand 2,335-52 ft., T.D. 2,354 ft.

Maunie, White County: Tide Water 2 M. Sissons, SW NW SW 19-6s-11e, pumped 19 bbl., shot 2,290-98 ft., Tar Springs sand 2,285 ft., T.D. 2,298 ft.

New Harmony, White County: Bay Pet. 2 Evans, SE NW SW 4-4s-14w, pumped 90 bbl., shot 2,787-2,815 ft., Aux Vases sand 2,787-2,802 ft., T.D. 2,815 ft.

North Boos, Jasper County: H. L. Hunt 1 J. O. McClure, NW SE 17-6n-10e, pumped 211 bl., acidized, McClosky 2,810-20 ft., T.D. 2,825 ft.

Phillipstown, White County: Jarvis & Marcell 2 L. G. Cleveland, SW NE NE 1-5s-10e, pumped 160 bbl., natural, Tar Springs sand 2,313 ft., T.D. 2,328 ft.

Sun 9 H. J. Garner, NE SW NW 6-5s-11e, pumped 150 bbl., perf. 2,026-38 ft., 2,288-98 ft., Tar Springs sand 2,286-96 ft., 2,330-56 ft., T.D. 2,356 ft., P.B. 2,354 ft.

(Continued on Page 216)

OHIO, INDIANA, KENTUCKY

Washington Gas Pool, Holmes County, Extended Half-Mile West

ZANESVILLE, Ohio.—The Washington gas pool in Holmes County was extended ½ mile to the southeast by the completion of the Ohio Fuel 1 Nicholas Derr, Section 20, Knox Township. The Clinton sand was found at 3,075-88 ft. and the well gaged 5,680,000 cu. ft. natural with a rock pressure of 1,075 lb. The Preston Oil completed a 118-bbl. well on the east side of the Clayton pool on the Williams tract in Section 9 indicating an extension of the pool to the east. A semiwildcat on the Kanan & Henderson tract, Section 1, Reading Township, Perry County, proved to be dry.

OHIO COMPLETIONS

Holmes County, Knox Township: Ohio Fuel 1 Nicholas Derr, Sec. 20, Clinton, 5,680,000 cu. ft. gas, T.D. 3,090 ft.

Washington Township: Ohio Fuel 1 Grace Drumm, Sec. 26, Berea, 112,000 cu. ft. gas, T.D. 640 ft.

Medina County, Hinckley Township: Wiser Oil 2 C. D. Eastwood, Lot 28, Clinton, 525,000 cu. ft. gas, T.D. 3,482 ft.

H. C. Bishop 1 Van Deuson, Lot 54, Clinton, dry, T.D. 3,251 ft.

Meigs County, Rutland Township: Pearl Ash 3 James Titus, Sec. 16, Maxon, 250,000 cu. ft. gas and 3 bbl. oil, T.D. 796 ft.

Monroe County, Summit Township: Burns et al 3 Harold Weisand, Sec. 32, Stray, 64,330 cu. ft. gas, T.D. 882 ft.

Wayne Township: Decker et al 10 Fred Bartenschlog, Sec. 22, Berea, 80,000 cu. ft. gas, T.D. 1,952 ft.

Morgan County, York Township: Swingle et al 1 C. B. Eveland, Sec. 24, Berea, 187,000 cu. ft. gas, T.D. 1,236 ft.

Muskingum County, Newton Township: Ohio Fuel 1 Floyd Baker, Sec. 36, Clinton, dry, T.D. 3,546 ft.

Perry County, Bearfield Township: Ohio Fuel 1 H. M. Fell, Sec. 1, Berea, 168,000 cu. ft. gas, T.D. 1,186 ft.

Clayton Township: Preston Oil 3 V. E. Williams, Sec. 9, Clinton, 118 bbl., T.D. 3,380 ft.

Reading Township: Industrial Gas 1 Kenan & Henderson, Sec. 1, Clinton, dry, T.D. 3,198 ft.

Stark County, Pike Township: East Ohio 1 J. and M. Umsted, Sec. 22, Clinton, 414,000 cu. ft. gas, T.D. 3,856 ft.

Wayne County, Clinton Township: Max Johnston 1 Louis A. Gray, Sec. 5, Clinton, dry, T.D. 3,150 ft.

Greene Township: Hanley & Bird 1 John E. Kurtz, Sec. 16, Clinton, 149,000 cu. ft. gas, T.D. 3,591 ft.

INDIANA

EVANSVILLE, Ind.—In Vanderburg County, the Sells Petroleum Co. has completed the 5 J. A. McCarty in the Waltersburg pay at 1,773-76 ft. for an initial production of 75 bbl. daily and are setting pumping equipment on the 6 J. A. McCarty, E½ SW NW 32-6s-11w, for a production test of the Waltersburg sand. The 6 McCarty is showing for a 60-bbl. well.

Another completion in the Vernon Heights pool is the Illind Oil and H. G. Lewis T. Schutte, SE SE SW 20-6s-11w, which was completed in the Waltersburg sand at 1,805-18 ft., for an initial production of 50 bbl. of oil and 20 bbl. of water daily. The Roy Lee Trustee has been abandoned as dry at a total depth of 2,501 ft., with no shows of commercial saturation encountered.

INDIANA COMPLETIONS

Spencer County: M. B. Siegel 1 J. Miller, NE SW SW 29-6s-6w, dry at 1,503 ft., Palestine 840 ft., Menard 864 ft., Tar Springs sand 1,040 ft., Glen Dean 1,097 ft., Golconda 1,150 ft., Ste. Genevieve 1,417 ft.

Vanderburg County: Illind Oil 1 Schutte, SE SE SW 20-6s-11w, pumped 50 bbl. oil and 20 bbl. water, shot 1,805-18 ft., Waltersburg sand 1,804 ft., T.D. 1,818 ft.

Roy Lee, trustee 1 Oakland City College, E½ SE SW 3-7s-14w, dry at 2,501 ft., Menard 1,575 ft., Waltersburg sand 1,730 ft., Glen Dean 1,820 ft., Hardinsburg 1,846 ft., Golconda 1,949 ft., Cypress sand 2,113 ft., Renault 2,310 ft., Aux Vases sand 2,377 ft., Ste. Genevieve 2,384 ft., McClosky 2,446 ft.

Sells Pet. 5 McCarthy, SW SW NW 32-6s-11w, pumped 80 bbl., Waltersburg sand 1,773 ft., T.D. 1,776 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—Eastern Kentucky drilling activities continued on the same even trend during the week but no completions were reported here.

A number of wells have reached or are very near the completion depth and should be reported completed within the next week or so. In one or two instances cleaning-out operations are under way.

For the first time in several weeks no new locations were reported although roads have been completed to two wells and rigging-up operations are under way at three others.

WESTERN KENTUCKY

OWENSBORO, Ky.—In the Uniontown pool the Sun Oil Co. is still testing the Tar Springs sand in the 4 Uniontown unit. The pay was found from 1,889-1,907 ft. and was given a 30-qt. shot. The well is showing for about 75 bbl. of oil a day from the new pay for this pool.

About 3 miles west of Robards in Henderson County, the Carter Oil Co. has set casing for a test of the Benoist sand at 2,350-73 ft. in the 1 S. T. Denton. This interval of the Benoist was tested by a drill-stem test which recovered 1,590 ft. of clean oil, 35 ft. of gas and 30 ft. of muddy oil with no water. The 1 Denton is located about 7 miles from other oil production and if successfully completed will open a new pay zone for the western Kentucky area.

Drilling operations are once more getting under way in the Smith Hills pool after about a 10-day shutdown due to high water. Considerable mud remains in the field, however, and will slow operations.

HILL-HUBBELL
STEEL PIPE PROTECTION
PLAYS AN IMPORTANT PART

"PASS THE AMMUNITION" is not limited to shells. Oil and gas are vital to the manufacture of war material. Shatter-proof, underground steel pipe lines are necessary for trouble-free transmission of these home front ammunitions.

HILL-HUBBELL STEEL PIPE PROTECTION is recognized by leading pipe line engineers as the standard.

Since HILL-HUBBELL factory processed steel pipe requires less time to install, pipe lines get into service quicker and at no greater cost.

A request on your letterhead will bring a copy of The Book of Pipe Protection, which describes our process in detail.

GENERAL PAINT CORPORATION
HILL, HUBBELL & CO. • Division • Cleveland, Ohio
TULSA • SAN FRANCISCO • LOS ANGELES • OAKLAND • PORTLAND • SEATTLE • SPOKANE

New Wilcox Sand Pool Opened Southwest of Lake Creek

HOUSTON, Tex.—La Gloria Corp.-Grey & Wolfe 1 Grogan-Cochran Lumber Co., a wildcat test 3 miles southeast of Magnolia, Montgomery County, flowed at the rate of 288 bbl. of 39-gravity oil per day, with ⅛-in. choke at the top and ¼-in. choke at the bottom, on a drill-stem test through perforations at 8,750-72 ft. Working pressure was 2,400 lb.

The well flowed at the rate of 144 bbl. of distillate per day, with ⅛-in. top and ¼-in. bottom chokes, through perforations at 9,710-26 ft. Working pressure was 2,800 lb. and bottom-hole pressure 4,700 lb.

The well was connected up, ready for dual completion if permission should be granted. It is southwest of the Lake Creek field, in the Pinehurst area, and the name Pinehurst is expected to be given by the state Railroam Commission at a meeting February 3, when new field rules will be discussed. A well-spacing program for the area is to be considered, and the request for permission to make a dual completion is expected to be acted upon.

Humble Oil & Refining Co. 1-B Houston Farms Development Co., in the Halls Bayou area of Brazoria County, continued to present a puzzle. At total depth of 13,253 ft., plugged back to 10,918 ft., it flowed mud and salt water, with a slight gas show. Preparations were being made to squeeze and perforate.

Glenn H. McCarthy 1 Maco Stewart, in the James Spillman Survey of Galveston County, drilled to total depth of 7,780 ft., encountered heaving shale. The operator was preparing to set cement plug at 5,170 ft. and abandon the hole.

O. W. Killam et al 1 M. A. Dodd, 4 miles southeast of the Josh Richardson field, in Harris County, was dry at 7,510 ft. This wildcat test topped the Heterostegina at 3,110 ft., Textuoaria Warreni 4,746 ft., Textularia Hockleyensis 5,461 ft. The Killam well was one of three wildcat ventures that came in dry during the week.

Texas Co. was trying to complete its 1 Wayne Silliman on the west flank of the Ganado field, Jackson County, at total depth of 6,658 ft., with perforations at 5,635-45 ft., in a new sand in that field.

TEXAS GULF COAST COMPLETIONS

Wildcats

Harris County: O. W. Killam et al 1 M. A. Dodd, 4½ mi. north of Addicks, dry 7,510 ft.

Jackson County: W. S. Boyle et al 1 A. C. E. Simmons, 3 mi. southeast Ganado, dry 1,000 ft.

Lavaca County: Fidelity Oil & Royalty 1 W. L. Sartwell, J. Frazier Sur., dry 9,225 ft.

Fields

Bailey's Prairie, Brazoria County: Glenn B. McCarthy 1 M. S. Munson, C. Smith Sur., dry 11,453 ft.

Boling, Wharton County: Danciger Oil & Ref. Co. 1 R. L. Autry, S. F. Austin Sur., 127 bbl., pump, T.D. 3,104 ft., P.B. 3,030 ft.

Charles Eliot et al 1 J. H. Pridgen, J. Huff Sur., dry 4,115 ft.

Hardin, Liberty County: Gulf 3 M. F. Tullos, H. B. Johnston Sur., A-55, O.W.W.O., dry at old T.D. 7,633 ft., P.B. 7,590 ft.

Lovell's Lake, Jefferson County: Humble 41 Broussard Trust Co., Hildebrandt Sur., A-28, 151 bbl., ⅛-in. choke, perf.

(Continued on Page 251)

LARGE ENOUGH . .

to adequately serve the industry. PERSONALIZED ENOUGH to understand and be helpful with the oil man's individual needs.

STATEMENT OF CONDITION
AS OF DECEMBER 31, 1942

RESOURCES		
Loans and Discounts		$ 42,991,803.72
Bankers' Acceptances and Commodity Loans		13,911,371.50
Banking House		1,918,900.00
Other Real Estate		165,458.40
Furniture and Fixtures		285,218.05
Stock in Federal Reserve Bank		300,000.00
U. S. Government Securities		43,979,457.47
State, Municipal and Other Securities		2,615,710.76
Cash in Vault and with Banks		57,320,472.30
Total		$163,488,392.20
LIABILITIES		
Capital	$ 5,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	600,978.52	$ 10,600,978.52
Reserve for Taxes, Etc.		730,465.82
DEPOSITS:		
Individual	$79,428,326.83	
Banks	57,597,820.95	
U. S. Government	15,130,800.08	152,156,947.86
Total		$163,488,392.20

REPUBLIC NATIONAL BANK
OF DALLAS
MEMBER FEDERAL DEPOSIT INSURANCE CORP.

ONE OF THE NATION'S 100 LARGEST BANKS

Wildcats in Phillips, Pratt and Russell Counties Show Oil

IN Phillips County, northwestern Kansas, Cities Service Oil Co. 1-C Hansen, which last week had reported a hole full of oil before making completion tests, was swabbing at the rate of 64 bbl. in 24 hours. Total depth of the well is 3,799 ft. in granite. Perforations at 3,538-48 ft. put 900 ft. of water in the hole and at 3,360-71 ft. there was 600 ft. of oil and some water. Twenty-four holes at 3,363-71 ft. after setting plug at 3,396 ft. filled the hole with 36.6-gravity oil in 14 hours.

In Pratt County, 2 miles northeast of the East Iuka pool, Hollow Drilling Co. 1-B Brown, SW SW SE 29-26-12w, opened a new Arbuckle lime pool with a potential of 3,000 bbl. On swabbing tests it made 145 bbl. of oil in 8 hours, off bottom. Shell, Skelly and Champlin Refining Co. have staked offset locations on the north, northeast and east, respectively. This well has been testing for several weeks.

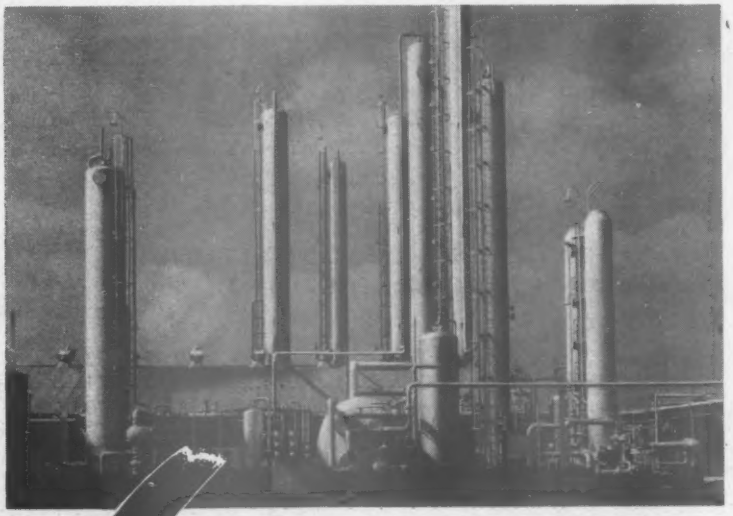
Dickey Oil 1 Eulert, SW SW NW 26-11-15w, a Russell County wildcat that has been watched with interest and which had reported shows of oil in Topeka lime at 2,732-46 ft., acidized the Arbuckle at 3,332-35 ft. and swabbed 4 bbl. of oil an hour. Location is east of the Fairport pool.

Two wildcats officially completed last week, opening new pools, were in Butler and Ellis County. Darby Petroleum 1 Huber, W½ NE SW 31-12-20w, 2 miles east of the Gugler (Trego County) pool, pumped 337 bbl. of oil a day in Arbuckle at 3,832 ft. The Gugler pool also produces from Arbuckle dolomite at approximately the same depth.

The other well, discovery of the Vandenburg pool and previously announced as in the process of completion, pumped 70 bbl. of oil in 10 hours but was given potential of 35 bbl. Pay is the Kansas City lime at 2,122-27 ft.

The Zenith pool of Reno County is still bringing in good producers. Magnolia Petroleum Co. 1 Newt Darr, SW NW 6-24-10w, flowed 353 bbl. of oil in 12 hours through ⅛-in choke. After acid treatment it flowed as high as 88 bbl. of oil an hour.

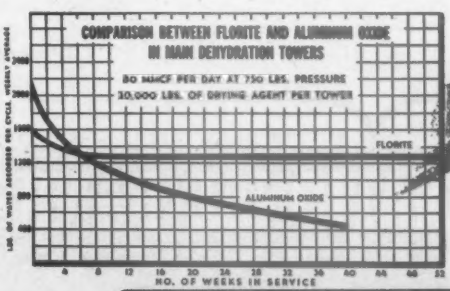
Dickey Oil Co. added three Viola wells to the Lindsborg pool of McPherson County. The wells are offsets to the 1 Rundberg, which attracted attention to the field early in the summer when it was brought in as a 1-mile south extension to the field. The completion of these three wells brings the proven area of the southern tip of the field to 200 acres.



n Dehydration for REPRESSURING

the approved Desiccant is Florite*

The chart below represents the long-term efficiency of FLORITE* as a drying agent for natural gas. FLORITE* is now the approved desiccant in many such operations, especially those for repressuring. Is equally effective in the treatment of various other gases and liquids. Will selectively adsorb 4 to 20% its weight of water — is regenerated by heating to 350° F. Nationally known chemical manufacturers are among the regular users. Full information on request.


COMPARISON BETWEEN FLORITE AND ALUMINUM OXIDE IN MAIN DEHYDRATION TOWERS
80 MMCF PER DAY AT 750 LBS. PRESSURE
20,000 LBS. OF DRYING AGENT PER TOWER
FLORITE
ALUMINUM OXIDE
NO. OF WEEKS IN SERVICE

*Trademark Registered

The long-sustained effectiveness of FLORITE in adsorbing relatively large amounts of water is shown. Note that the results were more and more favorable to FLORITE as weeks passed.

FLORIDIN COMPANY, INC.
ADSORBENTS
WARREN, PA.

KANSAS COMPLETIONS

Wildcats

Butler County: J. J. Lynn 1 Vandenburg, SW SE NW 35-27-6e, pumped 35 bbl., Kansas City 2,122-27 ft., T.D. 3,220 ft.

Cowley County: Benedum & Trees 1 Kufus, NE SW NE 26-30-5e, dry, T.D. 2,950 ft., Kansas City 2,295 ft., Bartlesville 2,786 ft., Mississippi lime 2,945 ft.

Ellis County: Darby Pet. 1 Huber, W½ NE SW 31-12-20w, pumped 337 bbl., Arbuckle 3,832 ft., T.D. 3,847 ft.

Phillips County: Davis Child Motor Co. 1 Byerlein, SW NE 17-3-18w, dry, T.D. 3,664 ft., Topeka 2,980 ft., Lansing 3,202 ft., conglomerate 3,586 ft., Arbuckle 3,606 ft., stain 3,218 ft., porosity 3,606 ft.

Rooks County: Lario et al 1 Nutsch, W½ NW SE 3-10-20w, dry, T.D. 3,948 ft., Lansing 3,512 ft., conglomerate 3,794 ft., Simpson 3,876 ft., Arbuckle 3,898 ft.

Fields

Eberhardt, Rice County: Wood River Oil & Ref. 2 Doll, N½ SW SW 19-19-10w, pumped 979 bbl., Arbuckle 3,314-30 ft.

When Oil Fields Are No Longer Battlefields

Working around the clock are the Butler metal-crafters and the machines that ordinarily build for you better bolted steel tanks, runways, and stairways. Day and night they are producing what is proving to be some of the most vital equipment of modern warfare—steel runways for airdromes. On jungle swamp land, on the tundra and morass of the arctic regions, on desert or meadow land it is laid in days instead of months. Until it is laid our warplanes cannot bring to bear their unmatched force and fury to destroy ruthless and still powerful enemies around the globe.

When that job is finished, when oil fields are no longer battlefields, Butler metal-crafters, with war-sharpened skill, will turn to making even better equipment for the world-wide job of oil field reconstruction.

In the meantime, to the best of our ability under war conditions we stand ready to help in making your present equipment produce more and more of the world's oil needs.

BUTLER MANUFACTURING COMPANY

KANSAS CITY, GALESBURG, MINNEAPOLIS

Sales Offices: Washington, New York
Chicago, Atlanta, Shreveport.
Export Office: 8 South Michigan, Chicago.

For prompt handling address all inquiries to Kansas City, Mo. or Minneapolis, Minn., U. S. A.

BUTLER BUILT

BOLTED TANKS, RUNWAYS AND STAIRWAYS

Fox Bush, Butler County: R. G. Morrison 1 Bush, SE NW 24-29-5e, pumped 30 bbl., Bartlesville 2,776-2,836 ft.

Graber, Harvey County: Keener Oil 1 Lagree, NW SE SE 6-22-1w, dry, T.D. 3,530 ft., Hunton 3,272 ft.

Hafferman, Rice County: Aylward Prod. 1 Schoonover, SW SW SW 31-18-9w, dry, T.D. 3,351 ft., Arbuckle 3,348 ft.

Lanterman, Barton County: Lario 1 Musenberg, E½ SE SE 9-19-11w, dry, T.D. 3,357 ft., Arbuckle 3,323 ft.

Lindsborg, McPherson County: Dickey Oil 3 Rundberg, W½ NE NE 19-17-3w, pumped 50 bbl., Viola 3,363-67 ft.

Dickey Oil 2 Rundberg, W½ SW NE 19-17-3w, pumped 75 bbl., Viola 3,362-70 ft.

Dickey Oil 1 Johnson, W½ SE NW 19-17-3w, pumped 150 bbl., Viola 3,363-70 ft.

McLouth, Jefferson County: Apperson 1 McLeod, NE NE NW 9-10-20w, dry, T.D. 1,708 ft., Mississippi lime 1,574 ft.

Marshall, Ellis County: Aylward 5 Meis, N½ SW NW 6-12-17w, pumped 15 bbl., Arbuckle 3,682-87 ft.

Silica, S., Barton County: Gulf 1 Langfeld, NE NE SE 15-20-11w, dry, T.D. 3,311 ft., Arbuckle 3,298 ft.

Zenith, Reno County: Magnolia 1 Newt Darr, SW NW 6-24-10w, flowed 353 bbl. in 12 hr., Viola 3,709-19 ft.

NEBRASKA

ST. JOSEPH, Mo. — Very cold weather and snow tied up operations in the Forest City basin the past week. Near Tarkio, in Atchison County, Missouri, Cities Service Oil Co. had built a 500-bbl. tank at the site of its 1 Jim Cook in NW NW NW 32-65n-39w. More tanks were on the way. At last report water still had not been excluded from the oil in the Bartlesville sand and the company was expected to order more cement jobs.

Nebraska remained quiet for the most part. Oil men there were uneasy the past week when they heard talk in the state legislature of placing a 2-cent tax on each barrel of oil produced. Some operators say they are barely breaking even now.

NEBRASKA COMPLETIONS

Gage County: Gage County Development Co. 1 Humphries, NW NW SE 27-2n-7e, dry, T.D. 2,000 ft.

Rocky Mountain Area

(Continued from Page 208)

liner on bottom, 627,000 cu. ft., 232 lb. pressure.

Montana-Dakota No. 687, NE SW SW 36-32n-33e, T.D. 996 ft., Bowdoin 696-746, Phillips 931-940 and 970-980, 5½-in. 696 ft., 4½-in. perf. liner on bottom, 439,000 cu. ft., 228 lb. pressure.

Montana-Dakota No. 656, C SE NE 8-31n-32e, T.D. 1,150 ft., 25,000 cu. ft., in Phillips sand at 1,056-60 ft., plugged and abandoned.

Montana-Dakota No. 636, C SW 16-32n-33e, T.D. 1,00 0ft., Bowdoin 692-765, Phillips 872-1,000, 5½-in. 692 ft., 4½-in. perf. liner on bottom, 648,000 cu. ft., 237 lb. pressure.

Cedar Creek, Fallon County: Montana-Dakota No. 167, C SW 19-9n-59e, T.D. 1,100 ft., 350,000 cu. ft., from Judith River at 995-1,100 ft., 91 lb. pressure.

Montana-Dakota No. 166, NW NE SW, 35-10n-58w, T.D. 950 ft., 3,850,000 cu. ft., 85 lb. pressure, from Judith River at 883-950 ft.

Cut Bank, Glacier County: Santa Rita Oil & Gas Co. 4 Jacobson, C NW SW 23-37n-5w, T.D. 2,640 ft., 7-in. 2,430 ft., Sunburst saturated at 2,435-50 ft., upper Cut Bank 2,565-85 ft., lower Cut Bank 2,599-2,613 ft., show oil 2,605-13 ft., P.B. to 2,455 ft. and completed in Sunburst for 50 bbl., swabbing, second 24 hours.

Texas Co. 8 Lindquist, CEL NE SW 20-32n-5w, T.D. 2,720 ft., 7-in. 2,676 ft., upper Cut Bank 2,665-2,711 ft., no lower Cut Bank, swabbed 110 bbl. first 24 hours, then shot 90 qt., cleaning out.

Illinois Fields

(Continued from Page 211)

Sun 10 H. J. Garner, SW SW NW 6-5s-11e, pumped 100 bbl., natural, Tar Springs sand 2,246-60 ft., 2,098-2,311 ft., T.D. 2,311 ft.

South Johnsonville, Wayne County: Pure 1 Spicer Consol., NE SW SW 8-1s-6e, pumped 352 bbl., natural, Aux Vases sand 3,017 ft., T.D. 3,039 ft.

South Lawrence, Lawrence County: Sam Malis et al 3 Walker, N½ SW SW 26-2n-12w, dry at 1,455 ft.

Sam Malis 1 C. Potts, NW NE SW 26-2n-12w, pumped 75 bbl., shot 1,392-1,410 ft., T.D. 1,411 ft., Biehl 1,392-1,410 ft.

Storms, White County: Pure 4 Pule Consol., NW SW SE 18-6s-9e, pumped 30 bbl., shot 2,933-60 ft., perf. 2,658-84 ft., Weller 2,664-80 ft., Aux Vases sand 2,925-40 ft., T.D. 2,960 ft.

Walpole, Hamilton County: Texas 4 R. McGill, SE SE NE SW 27-6s-6e, gas-input well, shot 3,073-3,103 ft., Aux Vases sand 3,058-98 ft., T.D. 3,107 ft.

Texas 2 J. W. Shasteen, SE SE NW 34-6s-6e, pumped 128 bbl., shot 3,110-31 ft., Aux Vases sand 3,105-25 ft., T.D. 3,131 ft.

Woodlawn, Jefferson County: Shell 2 A. Howe, SE SW SW 25-2s-1e, pumped 28 bbl. oil and 26 bbl. water, shot 1,983-86 ft., Benoist sand 1,986 ft., T.D. 1,986 ft.

NAYLOR . . .
The Light-weight Pipe
For Heavy-duty Service

- Saves WEIGHT
- Saves STEEL
- Saves TIME on installation
- STRONGER - Leaktight - SAFER
- Handles JOBS normally requiring heavier-wall pipe
- Cuts handling COSTS
- Ideal in VACUUM Service
- Saves MAINTENANCE
- Saves MONEY

NAYLOR Threaded Surface Casing is an "ace in the hole." No joint welding. No field welding equipment. The Spiral helps centralize the Casing in the hole. Uniform lengths, light weight and accurate threading speed handling and setting — save money.

Advantages like these have made Naylor the outstanding pipe for gas-gathering service. Thanks to the exclusive Lockseam Spiralweld, no other light-weight pipe can match Naylor performance. Sizes from 4" to 30" in diameter with all types of fittings and connections.

Call our distributors or write for catalog

Naylor

MID-CONTINENT SUPPLY COMPANY
FORT WORTH, TEXAS and Branches
EXCLUSIVE DISTRIBUTORS IN ARKANSAS, KANSAS LOUISIANA, NEW MEXICO, OKLAHOMA and TEXAS

NAYLOR PIPE COMPANY
1232 East 92nd Street • Chicago, Illinois

LOUISIANA GULF COAST

Old Pine Prairie Dry Hole Recompleted as Producer

NEW ORLEANS, La.—C. & I. Production Co. 1 Sam Haas estate, in 2-4s-1w, Pine Prairie field, Evangeline Parish, finished as a dry hole February 20, 1942, has been recompleted as a producer following a workover job. The original total depth was 8,749 ft. By way of reconditioning, the hole was plugged back and sidetracked at 2,050 ft. and then drilled to a new total depth of 9,149 ft. With perforations at 8,982-92 ft. and 9,015-27 ft., the well, in a test made last month, flowed 169 bbl. through ⅜-in. choke. Later, on a 2-hour potential test it flowed at the rate of 149 bbl. through ¼-in. choke, with tubing pressure of 1,275 lb., casing pressure of 1,475 lb. and estimated gas-oil ratio of 10,000.

The operator applied for permission to make a dual completion, but withdrew the application upon reaching the opinion that the packer had given way and that production was coming from perforations at 8,906-18 ft. The well then was completed with initial production of 165 bbl. through 12/64-in. choke. The well topped the Cook Mountain at 8,418 ft., Sparta lime 8,571 ft., and Sparta 8,911 ft.

George H. Echols 1 Kessler-Sternfels, in the Napoleonville area of Assumption Parish, which already had demonstrated that it had opened a new field, was completed in the past week and was shut in awaiting storage. The well flowed 192 bbl. through perforations at 9,030-39 ft., total depth 10,474 ft. It is on the northeast flank of the dome, on a small tract farmed out by Tide Water Associated Oil Co.

Humble Oil & Refining Co. 1 Louisiana Furs, Inc., 8 miles southwest of the Schooner Bayou field, in Vermilion Parish, flowed at the rate of 30.6 bbl. of 53-gravity distillate, through 7/64-in. choke on a drill-stem test, along with 2,950,000 cu. ft. of gas. Preparations were being made to squeeze and perforate.

Union Sulphur Co. 1 J. P. Gueno, in the Branch area of Acadia Parish, which the operator has been trying to kill since last November, flowed 344 bbl. of 51-gravity distillate and 38,600,000 cu. ft. of gas in a late gage. The company's 2 Gueno, drilled as a relief well, was at total depth of 10,300 ft. and cemented 5½-in. casing at 10,295 ft. It was waiting on the cement to set.

Amerada Petroleum Corp. was building road to 1 Harry B. Nelson, a wildcat location staked in 97-7s-12e, West Baton Rouge Parish, 2½ miles southwest of Port Allen. A. J. Bankhead and T. J. Markley are rigging up for 1 McInnis, a wildcat test in East Baton Rouge Parish, 6 miles southeast of Baton Rouge. The permit calls for a 7,500-ft. test.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Assumption Parish: George H. Echols 1 Kessler-Sternfels, 13S-12s-14e, Napoleonville area, 192 bbl., ⅛-in. choke, perf. 9,032-39 ft., T.P. 1,430 lb., T.D. 10,474 ft., *discovery.*

Fields

Golden Meadow, La Fourche Parish: Texas 26 L.L.&E.-Golden Meadow, 75-19s-21e, dry, 4,006 ft.

Lake Chicot, St. Martin Parish: Amerada-Phillips 2 Cyrus Case and B. J. Kurzweg, 31-11s-10e, 243 bbl., ⅛-in. choke, perf. 7,729-38 ft., T.P. 1,150 lb., gas-oil ratio 305 cu. ft., T.D. 9,500 ft.

Lirette, Terrebonne Parish: Humble 4 La Terre Co., 34-19s-19e, 6,000,000 cu. ft. dry gas, ¼-in. choke, perf. 10,410-50 ft., T.P. 3,400 lb., T.D. 10,545 ft.

Pine Prairie, Evangeline Parish: C. & I. Production Co. 1 Sam Haas, 2-4s-1w, O.W.W.O., old T.D. 8,497 ft., completed dry February 20, 1942; P.B. and sidetracked at 2,050 ft., drilled to T.D. 9,149 ft., 165 bbl., 12/64-in. choke, perf. 8,906-18 ft., T.P. 900 lb., C.P. 1,375 lb., gas-oil ratio 900 cu. ft., S.I. T.P. 2,400 lb., S.I. C.P. 2,800 lb.

Roanoke, Jefferson Davis Parish: Union Sulphur Co. 1-B T. A. Anding, 2-9s-4w, 148 bbl., ⅛-in. choke, perf. 8,705-13 ft., T.P. 1,600 lb., C.P. 125 lb., gas-oil ratio 1,080 cu. ft. T.D. 8,837 ft., P.B. 8,717 ft.

South Roanoke, Jefferson Davis Parish: Continental 2 N. E. Jaenecke, 24-10s-4w, dry 9,252 ft.

West Gueydan, Vermilion Parish: Magnolia 1-B Henry Reese, 5-12s-2w, 130 bbl., 6/64-in. choke, with 102,000 cu. ft. gas, perf. 10,068-72 ft., T.P. 1,700 lb., gas-oil ratio 748, T.D. 10,842 ft., *new sand discovery.*

SOUTHWEST TEXAS

Permit For Dual Completion to Be Asked For Duval County Discovery

CORPUS CHRISTI, Tex.—George W. Strake, who opened the Conroe field, in Montgomery County, 11 years ago with his 1 Southwest Texas Development Co., has opened another one, this time in Duval County, with his 1 Ira G. Yates estate. Permission to make a dual completion will be asked. The well, in the S.A.&M.G. R.R. Survey, 4½ miles northwest of the Fitzsimmons field, is testing about 400,000 cu. ft. of gas from perforations at 3,168-72 ft. in the Government Wells sand. Tubing pressure is 1,125 lb. and casing pressure 1,200 lb. Through perforations at 3,723-31 ft. the well swabbed oil and salt water. If dual completion is granted it is planned to use the gas from the Government Wells sand to lift oil from the lower sand, which is in the Pettus. Estimates indicate that the discovery should make 40 to 80 bbl. on gas lift. The Government Wells sand is reported to have logged 30 ft.

The Nomenclature Committee of the South Texas Geological Society has given the name Strake to the new Duval County field. Many persons expressed the view that the Conroe field, named after a nearby town which experienced a spectacular rise in prosperity, should have been called Strake, after the operator who had staked virtually all he owned on the wildcat venture and then borrowed from friends. Mr. Strake had an unshakable conviction that his Conroe well, in an area which was a subject of unfavorable reports by geologists, would be a producer.

Jake L. Hamon and Edwin B. Cox, of Dallas, Tex., have entered the Stratton field of Nueces County, having staked location for 1 William T. Davis, 467 ft. out of the west corner of their 80-acre lease in Bishop's Palo Alto subdivision of the Paso de Ancho grant.

Phillips Petroleum Co. abandoned as dry at 8,512 ft. its 1 M. B. Mastin wildcat in the Delores I. & A. Survey of Nueces County, 1½ miles northwest of the Shields field. No shows were disclosed.

A drill-stem test of Continental Oil Co. and Atlantic Refining Co. 1 J. E. Pettus in Goliad County, produced salt water and no oil through perforations at 8,070-80 ft. Perforations were squeezed and the well was waiting for the cement to set.

Seaboard Oil Co. of Delaware staked location for a 6,000-ft. Wilcox test 7 miles south of Falls City, in Karnes County.

Two new wildcats were staked in the South Central Texas area. H. C. Lefore will drill 1 F. H. Schmitt, 3 miles northeast of Taylor, in Williamson County. Rowen & Hope will drill

1 J. L. Saunders, a mile northwest of Lavernia, in Wilson County.

SOUTH TEXAS COMPLETIONS

Wildcats

McMullen County: Gorman Drilling Co. 1 E. S. Whitley, J. M. Whitley Sur. 128, dry 2,051 ft.

Edwin M. Jones 1 Hays-Ezzell, 16 mi. southeast of Tilden, dry 2,606 ft.

Starr County: Baldridge & King and Neuhaus 1 Vincent Saenz, 1¾ mi. southwest of Sun field, dry at 5,008 ft.

Fields

Colorado, Jim Hogg County: Humble 2-D T. T. East, Las Moritas grant, 22 bbl., ¼-in. choke, T.P. 50 lb., C. P. 0, gas-oil ratio 625 cu. ft., T.D. 3,272 ft.

East, Jim Hogg County: Sun 3-A T. T. East, Santo Domingo de Arriba grant, dry 4,778 ft.

Green Branch, McMullen County: Quintana Petroleum Corp. 5-C South Texas Syndicate, James Fitzpatrick Sur. 18, A-669, dry 6,242 ft.

Rincon, Starr County: Continental and W. R. Davis Co., Inc., W. D. Stephenson Sur. 907, 235 bbl., ⅛-in. choke, T.P. 500 lb., C.P. 700 lb., gas-oil ratio 338 cu. ft., T.D. 4,500 ft.

LOWER GULF COAST COMPLETIONS

Wildcats

Nueces County: Phillips 1 M. B. Mastin, 1½ mi. NW of Shield field, dry 8,512 ft.

Fields

Seeligson, Jim Wells County: Sun 15 P. Canales, W. L. Dickerson Sur., 134 bbl., 7/64-in. choke, perf. 6,046-50 ft., T.P. 1,275 lb., C.P. 1,300 lb., gas-oil ratio 670 cu. ft., T.D. 6,103 ft.

Seeligson, Kleberg County: Humble 11 King ranch-Cabeza, A. G. King Sur., 152 bbl., ⅛-in. choke, T.P. 1,125 lb., C.P. 1,080 lb., gas-oil ratio 1,080 cu. ft., T.D. 6,002 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcats

Guadalupe County: Weinert & Bauchman 1 G. Giesick, 12 mi. southeast of Seguin, dry 3,270 ft.

Fields

Dale, Caldwell County: R. R. Ogden 1 O. T. Moore, Jasper Gilbert Sur., 61 bbl., T.D. 2,325 ft.

CANADIAN FIELDS

Key Turner Valley Tests Nearing Critical Depths

CHATHAM, Ont.—Crude and natural gasoline production from all Alberta fields for the week ending January 11 averaged 27,685 bbl. daily, compared with 27,734 bbl. daily for the previous week and 27,976 bbl. daily for the corresponding week last year. The daily average included 26,126 bbl. of crude and 1,073 bbl. of natural gasoline from Turner Valley, and 486 bbl. of crude from outside fields.

Turner Valley Completion

In the North Turner Valley extension, Northwest-Hudson's Bay 11, LSD 15, 8-21-3w5, finished at 8,390 ft., with Madison at 7,930 ft., developed 1,349 bbl. daily initial production after acidizing, later settling to around 720 bbl. daily. Location is about a quarter mile southeast of Atlas-British Dominion 3, most northerly producer.

West Flank Test

On the west flank of the North Turner Valley extension, Northclonmel Petroleum 1, LSD 16, 7-21-3w5, has finished drilling at 8,850 ft. The test got the Madison limestone at 8,459 ft. and drilled about 80 ft. in the upper porous and 67 ft. in the lower zone. With 7-in. casing set at 8,126 ft., a string of 842 ft. of 4¾-in. was set as a liner, and cement drilled out, preparatory to gun-perforating and acidizing. It was the first time this completion method has been adopted in the Turner Valley field, the purpose being to secure more efficient control of the gas-oil ratio, Northclonmel 1, the first well to be completed in 7-21-3w5, is the most westerly completion in the North Turner Valley extension, being about ¾ mile west of Northwest-Hudson's Bay 11 and offsetting Atlas-British Dominion 2 a quarter mile to the southwest. Results here will have an important bearing on future drilling on the west flank.

TURNER VALLEY LIME TESTS

North Turner Valley: Miracle Royalties 1, LSD 13, 33-20-3w5, is fishing for drill pipe at 8,250 ft. with Madison limestone at 7,880 ft.

Royalite Oil 68, LSD 10, 22-20-3w5, is below 6,906 ft. with Madison limestone at 6,616 ft.

North Central Test in Lime

In the North Central area of Turner Valley, Royalite-Lowery 1, LSD 6, 11-20-3w5, got the Madison limestone at 7,636 ft. and is deepening below 7,655 ft. This well is testing a new area, northwest of the McLeod naphtha wells in the old Central Turner Valley field, and about 2 miles southeast of Model 1, the first crude producer in North Turner Valley. It is in line with crude producers farther to the northwest, and if production is secured it will open a considerable new area for development between the older north and central fields. The Madison here logged about 1,800 ft. deeper than in Model 1, indicating the well is somewhat farther down the flank of the structure.

Key Well Resumes

Northwest of the proven area of the North Turner Valley extension, the important key test of Bonaventure Royalties 1, LSD 16, 24-21-4w5, has resumed and is deepening in the upper Blairmore formation below 8,274 ft. The test got the upper Blairmore at 6,730 ft., about 255 ft. lower than Northclonmel 1 producer, and looks like an exceptionally deep test. Adanac 1, LSD 10, 19-21-3w5, another key test about a half mile to the southeast, got the lower Benton about 2,160 ft. higher, but has not yet reached the Blairmore at 4,577 ft.

South of the proven field, Brown Oil Corp. 6, LSD 15, 5-18-2w5, has rigged heavy duty rotary outfit and is cleaning out preparatory to resuming from 4,517 ft. The test was started several years ago but discontinued drilling when faulting was encountered in other wells in the south end of the field. Recently, drilling by Northwest-Hudson's Bay in 8-18-2w5 has indicated possibilities of extending production in this direction. Brown 6 is a southwest offset to Northwest-Hudson's Bay 8, recently completed as a substantial producer.

Moose Dome Showing

On the Moose Dome structure, northwest of Calgary, Dome Oil & Gas 3, LSD 7, 17-22-6w5, is below 2,828 ft. with diamond drill. An 8-ft. zone in the lower Devonian limestone showed oil, which will be tested after deepening. The depth approximates that at which, some years ago, Moose Oils 1, in the same general area, encountered light crude, of which several hundred barrels were shipped.

Deep Test Abandoned

In southern Saskatchewan, Northwest-Radville 1 deep test, LSD 16, 36-5-19w2, has been abandoned after a series of unsuccessful fishing jobs. The test, started on Norcanols acreage some 75 miles south of Regina by a group of associated companies, was drilled through the Madison and Devonian limestones into the top of the Ordovisian at 7,958 ft., when a fishing job developed. It was plugged back to 5,012 ft. and redrilled to 6,062 ft. when it ran into more trouble, ultimately necessitating abandonment. A second test will be drilled.

Saskatchewan Gas Show

In southwestern Saskatchewan, a substantial natural gas show under pressure was encountered around 3,300 ft. in the Boundary Petroleums-Twin Province 1, LSD 6, 21-11-29w3. The gas lifted the casing about 50 ft. in the derrick, causing some damage, which is being repaired preparatory to deepening.

OKLAHOMA

East Watchorn Defined on Northwest By a Dry Hole

THE first well to be completed dry in the East Watchorn pool of Pawnee County was reported last week. Champlin Refining Co. 1 Laird, NE NW 26-23-3e, had 5 ft. of dry Wilcox at 4,021 ft., total depth. It is at the northwest corner of the field. A ¼-mile extension at the south end of the field was completed as a gas well in Tonkawa lime at 1,787-1,805 ft. The well is J. E. Crosbie's 2 Doyoe, SW SW NW 36-23n-3e. It flowed 6,500,000 cu. ft. of gas at 740-lb. rock pressure.

In the new Cartersville gas field of Le Flore County, Western Oklahoma Gas Co. 1 Price, NE SE 31-9-24e, had an estimated 750,000 cu. ft. of gas in sand at 4,972 ft. and was completed dry at 5,525 ft. It is the second test for the area. The same company's discovery well, 1 McBee, in S½ SE NE 29-9n-24e, flowed 25,000,000 cu. ft. of gas a day in sand at 5,095-5,240 ft. The 1 McBee was completed in April 1942.

Stanolind Oil & Gas Co. and Amerada Petroleum Corp., Wilcox discovery, the 1 Bleeker, in NW SE SW 28-10n-2e, in Pottawatomie County, was shut in for additional storage tanks and connections after making a flow of 336 bbl. in 11½ hours. In 30-minute flow tests the well made 48½ bbl. the first period and 27½ bbl. the second half hour. The flow the latter period was through 1-in. choke. So far, all production tests have been through tubing. When adequate storage or pipe-line connections have been made and the well allowed to flow through casing, its true potential will be determined.

Pure Oil Co.'s 1 Fraser, discovery well of the Caddo deep pool in Carter County, has two new offset locations. Tide Water Associated Oil Co. was reported to be making location for its 1 Fraser in NW SW 26-3s-1e, as a west offset and Pure was digging cellar for 1 Dillard, NW NE SE 6-3s-2e, northeast of the discovery. Pay zone here is the Simpson sand at 5,400 ft.

OKLAHOMA COMPLETIONS

Wildcats

Kiowa County: B. C. Warlick 1 Wayne, NE SE SE 2-7n-18w, dry, T.D. 1,622 ft., granite 1,620 ft.

Pawnee County, 4 mi. W of East Watchorn: Wood Oil 1 Gilbert, SW SW NE 30-23n-3e, dry, T.D. 4,220 ft., Oswego 3,310 ft., Viola 4,155 ft., Wilcox 4,178 ft., second Wilcox 4,201 ft.

Fields

Cartersville, Le Flore County: Western Oklahoma Gas 1 Price, NE SE 31-9n-24e, dry, T.D. 5,525 ft., sand 4,972 ft., small show gas.

Cement, Caddo County: Ohio 9 Rigney, SW SE SE 12-5n-9w, pumped 200 bbl., sand 3,408-13 ft., T.D. 3,843 ft.

Cumberland, Marshall County: Pure 6 Chrisman-104, SE NE SE 20-5s-7e, flowed 256 bbl. in 4 hr., sand 5,782-5,885 ft., T.D. 5,895 ft.

Drumright, Creek County: Grimes & Neal 18 Tiger, NE NW 17-17n-7e, pumped 62 bbl., Oswego 2,299-2,334 ft., T.D. 2,344 ft.

Loco, Stephens County: Texas 1 Bristow, NW SW NE 8-3s-5w, pumped 21 bbl., pay 1,076-80 ft.

Tussy, Carter County: Allied Materials 1-B Gray, NE NE SW 9-1s-3w, pumped 50 bbl., pay 2,731-93 ft., T.D. 2,910 ft.

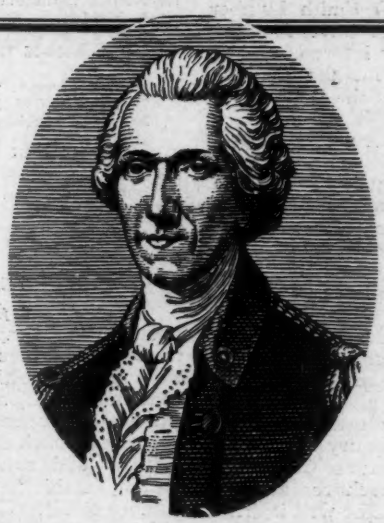
East Watchorn, Pawnee County: Champlin 1 Laird, NE NW 26-23n-3e, dry, T.D. 4,021 ft., Wilcox 4,016 ft.

J. E. Crosbie 2 Doyle, SW SW NW 36-23n-3e, 6,500,000 cu. ft. gas, Tonkawa 1,787-1,805 ft.

Miscellaneous

Creek County: Gulf 30 Clayton, NE NE SE 8-17-12, input well, T.D. 1,728 ft.

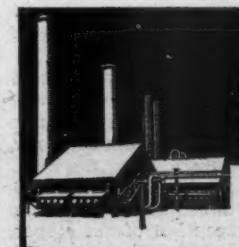
"The life and soul of science is its practical application."
—*Lord Kelvin.*



1753—1814
American born Benjamin Thompson went to England in 1776, rose to important position in British foreign office, became Count Rumford.

Count Rumford, after notable scientific experiments on heat in 1795, recognized a correspondence between work done and heat produced. He is credited with being the first to recognize heat as a mode of motion.

Pioneering physicists made scientific discoveries. Research and constructive engineering applied these discoveries to industrial usefulness. Alcorn, pioneer in heating for petroleum processing, places at your disposal 19 years' continuous engineering research and successful experience in providing efficient, economical heaters for the diverse, everchanging demands of oil refining.



ALCORN
Combustion Company
SCHAFF BUILDING, PHILADELPHIA
Los Angeles · Houston · San Francisco

Bradley 1 Bradley, SW NE NW 4-17n-11e, dry, T.D. 1,588 ft.
L. B. Jackson 1 Turner, NW NE 29-17n-11e, pumped 8 bbl., sand 2,007-56 ft.
Pontotoc County: Hurst et al 1-B Looney, N½ NW NW 31-5n-4e, dry, T.D. 1,959 ft., reported to have filled up 250 ft with oil in 1 hr., Pontotoc lime 1,943-59 ft.
Okmulgee County: B. Miller 12 Bruner, NW NE SW 23-15n-14e, pumped 4 bbl., Bartlesville 1,670-95 ft.

NORTH LOUISIANA, ARKANSAS

Calhoun County Wildcat Reports Oil Show In the Cotton Valley

SHREVEPORT, La.—In the El Dorado district, 6 miles northeast of the Rainbow City pool, H. L. Hunt and Placid Oil Co. 1 Smith Lumber Co. was reported to have found a show of oil. Definite information had not been released but the showing was believed to be in the Cotton Valley zone around 4,700 ft. and operators were setting casing for a possible production test.

Location of the test is in the south tip of Calhoun County and between the towns of Calion and Morrow Bay. A number of dry holes have been drilled in this area, three of which were completed over the past year.

The Nick Springs deep Smackover lime test encountered water in the lime and was plugged back to test the Cotton Valley zone at 5,800 ft. Total depth was not given but this is the second Smackover test in the pool, the first of which was dry at 6,819 ft.

Southeast of El Dorado, Carter Oil Co. was nearing Smackover at its 1 Foyoil in 12-19s-15w. The well is drilling below 7,700 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Caddo Parish: C. W. Beene 1 Bostwick, NW SE 11-18n-15w, dry, T.D. 1,011 ft.
Claiborne Parish: R. R. Sylvestre 1 S. P. Meadows, NE SW 23-22n-7w, dry, T.D. 6,018 ft.
Morehouse Parish: K. E. Merren et al 1 Bonner Memorial, NW NW 23-22n-7e, dry, T.D. 6,204 ft.
Natchitoches Parish: Blackwell Oil & Gas 1 Pardee, SE SE 30-12n-6w, dry, T.D. 6,510 ft.
Haynesville, Claiborne Parish: Skelly 1 L. L. Sherman, approx. N½ SW NW 1-23n-8w, flowed 280 bbl., Pettit 5,404-18 ft., T.D. 5,431 ft.
Nebo, La Salle Parish: Placid Oil 1 Brooks, SE SW 5-7n-3e, pumped 71 bbl., Wilcox 3,590-3,604 ft., T.D. 4,147 ft.
Sugar Creek, Claiborne Parish: Roy Lee 1 R. Sims, NW SE 29-20n-5w, dry, T.D. 6,251 ft.
Tensas Parish: California Co. 5 Applegate, 13-9n-10e, flowed 173 bbl., pay 4,548-76 ft.

ARKANSAS COMPLETIONS

Wildcats

Calhoun County: Placid Oil 2 Freeman-Smith Lumber Co., NW NW 12-15s-14w, dry, T.D. 4,615 ft.
Columbia County: Roy Lee 1 Pickler, SW NE 23-17s-21w, flowed 65 bbl. condensate, pay 8,051-55 ft., T.D. 8,116 ft.
Ouachita County: Danciger Oil & Ref. 1 Huddleston, NE SE 19-13s-16w, dry, T.D. 3,491 ft.

Fields

Macedonia, Columbia County: G. H. Vaughn 1 McMahan, C N½ SW 17-18s-21w, flowed 150 bbl., condensate in Cotton Valley 8,135-55 ft., oil 8,542-66 ft., T.D. 8,975 ft.
Midway, Lafayette County: Southwood Oil 7 Hodnett, SW NE 18-15s-23w, flowed 202 bbl., Smackover 6,336-6,466 ft., T.D

MISSISSIPPI COMPLETIONS

Simpson County: Gulf Ref. Co. 3 Wilbe Lumber Co., E½ NE NE 5-2n-4e, dry, T.D. 10,405 ft.

California Fields

(Continued from Page 205)

This fish the company was unable to recover even though several months were spent in fishing operations. Suspension of work on this hole had been anticipated for some time as there did not appear much chance of recovering the fish and resuming work. Deep drilling in this field has presented a number of difficult problems and unsatisfactory results during the past 2 years. The present well, 10-C Hobson, is the third deep test drilled by Chanslor-Canfield Midway Oil Co. the first two being put on the beam and proving to be very small wells despite the fact that both had substantial thicknesses of oil sand. The company's No. 9-B had over 1,000 ft. of oil sand but it was found that it lacked porosity and did not have enough gas to result in a natural flow. This large thickness of oil sand can be attributed to the probability that the hole drifted north across the Rincon fault and thus secured a duplication of the same zone due to a downward displacement to the north. The same situation developed in 10-C Hobson and this necessitated a redrill job which turned out badly due to mechanical trouble.

Standard Oil Co. is plugging back 1 Lloyd-South Basin in the Cat Canyon district of Santa Barbara County preparatory to testing some upper showings before abandoning the hole. This well was carried down to 7,250 ft. and was bottomed in brown shale but with the exception of the upper showings logged during the course of drilling failed to show any encouragement.

COASTAL DISTRICT COMPLETIONS

Gato Ridge wildcat district, Santa Barbara County: General Petroleum Corp. 1 Wickenden, 24-8n-32w, dry in basalt, T.D. 2,905 ft., top basalt 2,580 ft., no oil or gas showings logged.
Rincon, Ventura County: Honolulu Oil Corp. 56-4 Permit, 7-3n-24w, recompleted flowing 456 bbl., 30.2 gravity, 0.2 per cent cut, T.D. 3,024 ft., gun perf. 2,813-3,021 ft., set whipstock 600 ft., milled through casing and redrilled, completed in Miley oil zone of Pliocene age.

Drilling to Start Soon At Gilmore Island Test

Shell Oil Co., Inc., is just about ready to spud in 1 Verne Community which will be drilled in the Gilmore Island district of Los Angeles city and with the Miocene expected at comparatively shallow depths the future of this area should be determined within a very short time. The company erected a steel derrick on this property and then enclosed it with a composition of asbestos and rock wool to kill the sound as far as possible and to prevent any possibility of creating a nuisance while drilling. What Shell does during this exploratory work may have a large bearing on future drilling within the city limits of Los Angeles because if this job is completed without complaint from those holding adjacent residences and business properties it should make it easier in the future to secure approval of the Los Angeles City Council. This is important because there are several other spots where deep Miocene tests might be drilled to advantage within the city. At present there is a deep reluctance to open up additional territory for development but if operators are able to refer back to Shell's Gilmore Island project they may be able to secure authority to drill under the same conditions. It is generally admitted that drilling can be done with a minimum of noise provided the proper type of equipment is provided and the crews are cautioned against making noise. In the Wilmington field, one operator drilled very close to a hospital and succeeded in completing the well without causing any great inconvenience. West of where Shell is preparing to spud in its Gilmore Island deep test, McDuffie and Long are considering drilling a Miocene test in the Fox Hills area which in past years has sustained a number of Pliocene wells. The old Los Angeles City field may also receive a deep test in the not far distant future if Shell succeeds in getting Miocene production and this would really open up considerable acreage for exploitation. This development work could only be done, however, from within a steel and reinforced concrete building such as will be used by Shell in the Gilmore Island district. There is a city ordinance prohibiting the deepening of

any of the shallow wells in the Los Angeles City field or otherwise there would be some deepening operations already under way.

The Huntington Beach Chamber of Commerce has asked the city officials of Huntington Beach to take steps to prevent if possible any future drilling in the Huntington Beach tidelands unless the State of California complies with its agreement to devote a part of its revenues toward the purchase of additional park land at Huntington Beach. The State of California claims the tideland extending off the coast and has executed a number of leases with operators to drill and produce the tideland and promised to devote some of its revenue toward acquiring additional land in the Huntington Beach area. Thus far the state has failed to conform with the gentlemen's agreement and now that the state is advertising for additional operators to drill into the tideland accumulation it is proposed that the city of Huntington Beach refuse to allow directionally drilled wells from passing across city streets even though they are 4,000 ft. below the surface. These tideland wells are drilled from the uplands from surface locations back of the tideline and are directed to the location chosen by directional drilling.

LOS ANGELES BASIN COMPLETIONS

Huntington Beach, Orange County: Standard Oil Co. 39-A H. B., 3-6s-11w, pumped 86 bbl., 16.9-gravity, 1.5 per cent cut, 80,000 cu. ft. gas, T.D. 3,560 ft., gravel packed perf. 3,119-3,546 ft., completed in second Bolsa zone of Pliocene age.

Wilmington, Los Angeles County: O. M. Slosson 2 Banning, 34-4s-13w, pumped 55 bbl., 14.6-gravity, 1 per cent cut, T.D. 3,490 ft., gravel packed perf. 3,262-3,487 ft., completed in Ranger zone of Pliocene age.

Texas Co. 8 Refinery fee, 27-4s-13w, Pumped 66 bbl., 16.5-gravity, 2 per cent cut, T.D. 3,601 ft., 100-mesh gravel packed perf. 3,483-4,601 ft., completed in Ranger zone of Pliocene age.

Yorba Linda, Orange County: Shell Oil Co., Inc., 7-15 Olinda fee 4, 15-3s-9w, pumped 50 bbl., 16.4-gravity, 60 bbl. of water, T.D. 3,120 ft., P.B. 1,610 ft., perf. 1,342-1,422 ft., 1,485-1,606 ft., completed in Olinda zone of Miocene age.

Phillips Bid Accepted For Dunning Properties

FORT WORTH, Tex.—The oil properties of the W. H. Dunning, Jr., estate finally went to the Phillips Petroleum Co. after several weeks of bidding in which the Tarrant County Probate Court refused to approve transfer of the properties under several bids. In each case, just as the court was ready to approve sale, another bidder came forward. Phillips paid $1,265,000 for the properties.

Phillips has 20 days to examine abstracts and must submit them to the estate within 30 days. A surety bond was also required by the court. Buffalo Oil Co., Stanolind Oil & Gas Co. and Southland Royalty Co. were the other bidders.

Reduction Sought In Northern Domestic Gas Use

WASHINGTON, D. C.—Domestic consumers of natural gas in western and southern New York and in northern Pennsylvania last week were urged to reduce their consumption by 25 per cent during the next 10 weeks.

The appeal, issued by Donald M. Nelson, chairman of the War Production Board, said that a serious shortage is developing in the area and that diversion of 25 per cent of the volume normally consumed in domestic house heating, for hot water and lighting is essential to continued operation of numerous war industries.

Texas Gulf Coast

(Continued from Page 213)

7,710-12 ft., T.P. 1,125 lb., gas-oil ratio 657 cu. ft., T.D. 7,717 ft.

Lucky, Matagorda County: Stanolind 3 J. E. Thompson, E. Hall Sur., A-45, 635 bbl., ¼-in. choke, perf. 7,647-60 ft., T.P. 825 lb., gas-oil ratio 300 cu. ft., T.D. 8,552 ft.

North La Ward, Jackson County: Cities Service 1 C. Chamrod, J. White Sur., A-82, 55 bbl., 5/32-in. choke, perf. 5,206-23 ft., T.D. 5,228 ft.

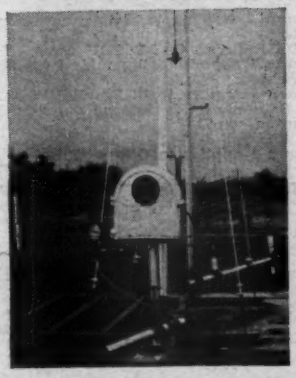
Cities Service 3 J. A. Graves, O.W.W.O., old T.D. 5,673 ft., P.B. 5,637 ft., P.B. to 5,412 ft., 152 bbl. through 3/32-in. choke, perf. 5,206-13 ft., T.P. 420 lb., C.P. 820 lb., gas-oil ratio 210 cu ft.

Stanolind 2 Louise Bonnot, A. M. Clare Sur., A-12, 14 bbl. through 10/64-in. choke, perf. 5,204-16 ft. and 5,219-24 ft., T.P. 100 lb., C.P. 350 lb., gas-oil ratio 883 cu. ft., T.D. 5,227 ft.

NIXON *Surface Control* GAS-LIFT SYSTEM

assures

PROFITABLE PRODUCTION



So extensive are the economies of the Nixon Gas-Lift, that savings on production begin with its installation.

Cost of the Nixon Gas-Lift; Cost of transportation and installation; Cost of operation and maintenance . . . are but a fraction of the cost of conventional pumping units.

Production is surface controlled. Large or small volumes handled by this system.

Nixon Gas-Lift Systems are available for immediate installation. Their manufacture requires only an extremely small amount of essential materials.

Hundreds of installations have proven its economy and efficiency. Ask a Nixon Gas-Lift engineer to show you case histories of "Profitable Production" with the Nixon Surface Control Gas-Lift System. Write your nearest Wilson Supply Co., store or sales office.

WILSON SUPPLY COMPANY

1412 MAURY STREET — HOUSTON, TEXAS

SALES OFFICES:

Tulsa, Oklahoma; Dallas, Texas

LOS ANGELES: Western Pressure Control Co., 5700 Santa Fe Avenue

TRINIDAD, B.W.I.: Neal Massey Engineering Corporation

BRANCH STORES:

TEXAS—Gladewater, Barbers Hill, Bay City, Monahans, Alice, Victoria, Corpus Christi.

LOUISIANA—Lake Charles, New Iberia, Harvey, Shreveport.

CRUDE PRICES

OKLAHOMA AND KANSAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 21	...	...	...	...	$.85	$.75	...
21-21.9	...	...	...	...	.87	.78	...
22-22.9	...	...	...	...	.89	.81	...
23-23.9	...	...	...	...	.91	.84	...
24-24.9	...	...	...	...	.93	.87	...
Below 25	$.92	...	...	$.86	...	...	...
25-25.9	.95	$.95	...	.88	.95	.90	...
26-26.9	.97	.97	...	.90	.97	.93	...
27-27.9	.99	.99	...	.92	.99	.96	...
28-28.9	1.01	1.01	$1.01	.94	1.01	.99	...
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	...
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

Column 1 Mid-Continent grades:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

Column 2 Mid-Continent grades:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

Column 3 Mid-Continent grades:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

Column 4 Jackson and Tillman counties:
Gulf Oil Corp., 5-20-41.

Column 5 Mid-Continent grades:
Standard Oil Co. (Indiana), 5-20-41.
National Refining Co., 5-20-41.

Column 6 Mid-Continent grades:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41.

Column 7 Oklahoma:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland	$1.14
Pure Oil Co., 9-4-41.	

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

Column 1 applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village, and Lewisville fields.

Column 2 applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek, and Nebo.

Column 3 applies to Bunkie, Eola, Olla, and South Olla.

Column 4 applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville, and Port Allen.

Column 5 applies to University (Baton Rouge). Posted 6-2-42.

Column 6 applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also to Caddo effective 10-15-41.

Continental Oil Co., 5-21-41.

Column 7 applies to Abbeville, Louisiana.

Stanolind Oil & Gas Co., 5-21-41.

Column 8 applies to East and West Hackberry.

Column 9 applies to Caddo Parish, effective 10-15-41.

Column 9 applies to Evangeline, Acadia Parish.

Lion Oil Refining Co., 5-22.41.

Column 1 applies to Reynolds lime, Jones sand, Schuler, Ark.

Column 2 applies to El Dorado, West and South Rainbow fields, Snow Hill, and Schuler-Morgan sand.

Placid Oil Co., 5-22-41.

Column 3 applies to Olla.

Column 2 applies to Nebo field.

Shell Oil Co., Inc., 5-20-41.

Column 10 applies to Roanoke, Chalkley.

Column 11 applies to Iowa, Black Bayou, White Castle.

Column 12 applies to Gibson, South Houma, Hester, West Lake Verret.

Magnolia Petroleum Co., 5-21-41.

Column 13 applies to Lockport, Cameron Meadows, and West Gueydan, La.

Column 6 applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.

Phillips Petroleum Co., 3-29-41.

Arkansas Fuel Oil Co., 2-19-42.

Column 1, Schuler (Jones sand), except schedule starts at 76 cents for below 25° gravity.

Gulf Refining Co., 5-21-41.

Column 9, Jennings.

Column 8, Edgerly, Starks, Vinton, East Hackberry, Cameron Meadows, and Leesville.

Column 16 applies to Grand Bay, Quarantine Bay, Timbalier Bay, and West Bay, except schedule starts at $1.12 for below 28° gravity.

Column 6 applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville, and El Dorado.

Column 4 applies to West Gueydan, effective 5-25-42.

Pure Oil Co., 4-22-41.

Column 14 applies to Gueydan crude.

Column 6, Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.

Texas Co., 5-21-41.

Column 6 applies to North Louisiana.

Columns 15 and **16**, Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

Column 17, Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club.

Column 18, Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS FLAT PRICES

Continental Oil Co., 5-21-41:	
Tepetate and Lake Arthur	$1.18
Ville Platte	1.20
Gulf Refining Co., 5-21-41:	
Smackover (Ark.)	$0.83
Lion Oil Refining Co., 5-22-41:	
Smackover (heavy)	.83
Dorcheat	1.15
Phillips Petroleum Co., 5-22-41:	
Smackover (heavy)	$0.83
Placid Oil Co., 5-22-41:	
Tullos-Urania (5-21-41)	$1.15
Cotton Valley dist. (above 60°)	1.30
Cotton Valley (Holloway sand)	1.25
Cotton Valley (Bodcaw-D sands)	1.20
Pure Oil Co.:	
Bosco (5-21-41)	$1.14
Sweet Lake (5-22-41)	1.06
Creole (5-22-41)	1.16
Republic Oil Co., 6-2-41:	
Nevada County, Arkansas	$0.80
Republic Oil Refining Co., 5-21-41:	
Bayou Pigeon	$1.20
Shell Oil Co., Inc., 5-20-41:	
Happytown	$1.15
Standard Oil Co. of Louisiana, 5-22-41:	
Big Creek, Dorcheat, McKamie (sour)	$1.15
Smackover (heavy)	.83
Cotton Valley distillate (9-1-41)	1.40
Cotton Valley (Holloway sand)	1.25

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18	...	...	...	...	...	...	...	...	...	...	...	...	$.94	...	...	...	...	...
18-18.9	...	...	...	...	...	...	...	...	...	...	...	...	.96	...	...	...	...	...
19-19.9	...	...	...	...	...	...	...	...	...	...	...	...	.98	...	...	...	...	...
Below 20	...	...	...	...	...	...	...	$1.06	...	$.94	$.99	$.89	...	...	$1.06	...	...	...
20-20.9	...	...	...	...	...	...	...	1.08	...	.96	1.01	.91	1.00	...	1.08	...	...	...
Below 21	$.68	...	...	$.90	...	...	...	...	...	...	...	...	...	$.90	...	...	...	...
21-21.9	.70	...	...	.92	...	...	...	1.10	...	.98	1.03	.93	1.02	.92	1.10	...	...	...
22-22.9	.72	...	...	.94	...	...	...	1.12	...	1.00	1.05	.95	1.05	.94	1.12	...	...	...
23-23.9	.74	...	...	.97	...	...	...	1.14	...	1.02	1.07	.97	1.08	.96	1.14	...	...	...
24-24.9	.76	...	...	.98	...	...	...	1.16	...	1.04	1.09	.99	1.11	.98	1.16	...	...	...
Below 25	...	$.86	$.98	...	...	$.88	...	...	...	...	...	...	...	...	...	...	...	...
25-25.9	.78	.88	1.00	1.00	...	.90	...	1.18	...	1.06	1.11	1.01	1.14	1.00	1.18	...	...	...
26-26.9	.80	.90	1.02	1.02	...	.92	...	1.20	...	1.08	1.13	1.03	1.17	1.02	1.20	...	...	...
27-27.9	.82	.92	1.04	1.04	...	.94	...	1.22	...	1.10	1.15	1.05	1.19	1.04	1.22	...	...	...
28-28.9	.84	.94	1.06	1.06	...	.96	...	1.24	...	1.12	1.17	1.07	1.21	1.06	...	$1.14	$1.06	...
29-29.9	.86	.96	1.08	1.08	...	.98	...	1.26	...	1.14	1.19	1.09	1.23	1.08	...	1.16	1.08	...
30-30.9	.88	.98	1.10	1.10	$1.28	1.00	...	1.28	...	1.16	1.21	1.11	1.25	1.10	...	1.18	1.10	$1.50
31-31.9	.90	1.00	1.12	1.12	1.30	1.02	...	1.30	$1.07	1.18	1.23	1.13	1.27	1.12	...	1.20	1.12	1.07
32-32.9	.92	1.02	1.14	1.14	1.32	1.04	...	1.32	1.09	1.20	1.25	1.15	1.29	1.14	...	1.22	1.14	1.09
33-33.9	.94	1.04	1.16	1.16	1.34	1.06	...	1.34	1.11	1.22	1.27	1.17	1.31	1.16	...	1.24	1.16	1.11
34-34.9	.96	1.06	1.18	1.18	1.36	1.08	...	1.36	1.13	1.24	1.29	1.19	1.33	1.18	...	1.26	1.18	1.13
35-35.9	.98	1.08	1.20	1.20	1.38	1.10	...	...	1.15	...	...	...	...	1.20	...	1.28	1.20	1.15
Below 36	...	...	...	...	...	...	$1.07	...	...	...	...	...	...	...	...	...	...	...
36-36.9	1.00	1.10	1.22	1.22	1.40	1.12	1.09	...	1.17	...	...	...	...	1.22	...	1.30	1.22	1.17
37-37.9	1.02	1.12	1.24	1.24	1.42	1.14	1.11	...	1.19	...	...	...	...	...	...	...	...	1.19
38-38.9	1.04	1.14	1.26	1.26	1.44	1.16	1.13	...	1.21	...	...	...	...	...	...	...	...	1.21
39-39.9	1.06	1.16	1.28	1.28	1.46	1.18	1.15	...	1.23	...	...	...	...	...	...	...	...	1.23
40 and above	1.08	1.18	1.30	1.30	1.48	1.20	1.17	...	1.25	...	...	...	...	...	...	...	...	1.25

Lisbon distillate 1.20

Texas Co., 5-21-41:
Erath $1.21
Garden Island 1.36
Lafitte, Paradis 1.19
Lake Mongoulois 1.36

CANADIAN FIELDS

Imperial Oil, Ltd.:
Petrolia, 11-6-39 ..... $2.10
Oil Springs, 11-6-39 ..... 2.07
Bothwell, 11-6-39 ..... 2.10
Turner Valley, 7-16-41 ..... $1.35-1.97

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.08
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27-27.9	1.19	1.24	1.24	.97	....	1.19	1.24
28-28.9	1.21	1.26	1.26	.98	....	1.21	1.26
29-29.9	1.23	1.28	....	.99	....	....	1.28
30-30.9	1.25	1.30	....	1.00	....	....	1.30
31-31.9	1.27	1.32	....	1.01	....	....	1.32
32-32.9	1.29	1.34	....	1.02	....	....	1.34
33-33.9	1.31	1.36	....	1.03	....	....	1.36
34-34.9	1.33	1.38	....	1.04	....	....	1.38
35-35.9	1.35	1.40	....	1.05	....	....	1.40
36-36.9	1.37	1.42	....	1.06	....	....	....
37-37.9	1.39	1.44	....	1.07	....	....	....
38-38.9	1.41	1.46	....	1.08	....	....	....
39-39.9	1.43	1.48	....	1.09	....	....	....
40 and above	1.45	1.50	....	1.10	....	....	....

SOUTH TEXAS AND SOUTHWEST TEXAS TABLE EXPLANATION

Column 1 Mirando:
Humble Oil & Refining Co., 5-21-41, includes Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.
Magnolia Petroleum Co., 5-21-41.
Continental Oil Co., 7-1-41, includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco, Driscoll, O'Hern, Piedra Lumbre, and Tarancahuas.
American Mineral Spirits Co., 5-21-41, includes Adami and Munson.
Republic Oil Refining Co., 5-21-41, includes Heyser field crude.

Column 2 Refugio:
Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove and Wade City.
Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth Saxet, Taft, and Tom O'Connor.
American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White Point.

Column 3 Refugio:
Texas Co., 5-21-41, includes Greta, Saxet, and Taft.

Column 4 La Rosa:
American Mineral Spirits Co., 3-29-41.

Column 5 Duval-Mirando:
Sun Oil Co., 5-21-41.

Column 6 Duval-Mirando:
Texas Co., 5-21-41.

Column 7 Nueces County:
American Mineral Spirits Co., 5-21-41.
Republic Oil Refining Co., 5-21-41.

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8
Below 20	....	....	....	....	$0.80	....	....	....
20-20.9	....	....	....	....	.82	....	....	....
Below 21	....	....	....	....	....	$0.81	....	....
21-21.9	....	....	....	....	.84	.83	....	....
22-22.9	....	....	....	....	.86	.85	....	....
23-23.9	....	....	....	....	.88	.87	....	....
24-24.9	....	....	....	....	.90	.89	....	....
Below 25	....	....	$0.88	....	....	....	$0.89	$0.95
25-25.9	$0.91	....	.90	$0.97	.92	.91	.91	.97
26-26.9	.93	....	.92	.99	....	.93	.93	.99
27-27.9	.95	....	.94	1.01	....	.95	.95	1.01
28-28.9	.97	$0.97	.96	1.03	....	.97	.97	1.03
29-29.9	.99	.99	.98	1.05	....	.99	.99	1.05
30-30.9	1.01	1.01	1.00	1.07	....	1.01	1.01	1.07
31-31.9	1.03	1.03	1.02	1.09	....	1.03	1.03	1.09
32-32.9	1.05	1.05	1.04	1.11	....	1.05	1.05	1.11
33-33.9	1.07	1.07	1.06	1.13	....	1.07	1.07	1.13
34-34.9	1.09	1.09	1.08	1.15	....	1.09	1.09	1.15
35-35.9	1.11	1.11	1.10	1.17	....	1.11	1.11	1.17
36-36.9	1.13	1.13	1.12	1.19	....	1.13	1.13	1.19
37-37.9	1.15	1.15	1.14	1.21	....	1.15	1.15	1.21
38-38.9	1.17	1.17	1.18	1.23	....	1.17	1.17	1.23
39-39.9	1.19	1.19	1.18	1.25	....	1.19	1.19	1.25
40 and above	1.21	1.21	1.20	1.27	....	1.21	1.21	1.27

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

Column 1 West Central and North:
Humble Oil & Refining Co., 12-11-41, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.
Panhandle Refining Co., 12-11-41, in Leuders area.
Gulf Refining Co., 12-11-41.
Sinclair Prairie Oil Marketing Co., 12-11-41.

Column 2 North Texas:
Continental Oil Co., 12-11-41.
Magnolia Petroleum Co., 12-11-41.
Panhandle Refining Co., 12-11-41.
Bell Oil & Gas Co., 12-11-41.
Texas Co., 12-11-41.

Column 3 East Central:
Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.
Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

Column 4 East Central:
Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

Column 5 East Central:
Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

Column 6 North Texas:
Stanolind Oil Purchasing Co., 12-11-41.

Column 7 Fisher County:
Shell Oil Co., Inc., 12-11-41.

Column 8 Mexia:
Sinclair Prairie Oil Marketing Co., 5-30-41.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41 $1.35
Agua Dulce (heavy), 10-16-41 ..... $1.25
Republic Oil Refining Co., 5-21-41.
Alfred and Magnolia City $1.35
Continental Oil Co., 5-21-41.
Alice, Benavides (North Sweden), Ben Bolt, Clark-Muil, Sun, and Tom Graham $1.35
Humble Oil & Refining Co., 5-21-41.
Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou $1.25
Sun Oil Co., 5-21-41.
Cass County $1.20
Texas Co., 5-21-41.
Cayuga, Anderson County $0.90
Pan American Production Co., 5-21-41.
Chapel Hill, Smith County:
Crude distillate $1.30
Crude oil 1.18
Chapel Hill Gas System, 11-7-41.
Clay Creek, Washington County $1.00
Sun Oil Co., 5-21-41.
Cleveland, Liberty County $1.26
Magnolia Petroleum Co., 5-21-41.
Conroe, Montgomery County $1.43
Humble Oil & Refining Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Cotton Lake (South) $1.35
Sun Oil Co., 5-21-41:
East Texas and Flag Lake* $1.25
*Humble Oil & Refining Co., 5-21-41.
Pan American Production Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Sinclair Prairie Oil Marketing, 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Stanolind Oil Purchasing Co.
Esperson (35° and above), South Esperson $1.30
Sun Oil Co., 5-21-41.
Flour Bluff, East Flour Bluff $1.33
Humble Oil & Refining Co., 5-21-41.
Hockley and Cochran $0.87
Texas Co., 5-21-41.
Livingston and Mercy $1.25
Shell Oil Co., Inc., 5-20-41.
Long Lake $1.23
Sinclair Prairie Oil Marketing, 5-21-41.
Luby $1.35
American Mineral Spirits Co., 5-21-41.
Luling $1.05
Magnolia Petroleum Co., 5-21-41.
Lytton Springs $1.17
Magnolia Petroleum Co., 5-21-41.
Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski $1.41
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
*Texas Co., 5-21-41.
Rincon (North), Sun, North Sun and Garcia $1.35
Sun Oil Co., 5-21-41.
Yturria $1.45
Sun Oil Co., 3-19-42.
Talco $0.79
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Tomball and Satsuma $1.40
Humble Oil & Refining Co., 5-21-41.
*Magnolia Petroleum Co., 5-21-41.
Stanolind Oil Purchasing Co., 4-1-41.
Van, Van Zandt County $1.08
Humble Oil & Refining Co., 5-21-41.
Pure Oil Co., 5-21-41.
Yates (regular) $0.95
Humble Oil & Refining Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Yates (shallow) $0.82
Shell Oil Co., Inc., 5-20-41.

TEXAS GULF COAST GRAVITY TABLES

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06	....	$0.98	$0.93
20-20.9	1.08	1.08	....	1.00	.95
Below 21	....	....	$1.08	....	....
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.9	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38	....	1.38	1.30	1.25
36-36.9	1.40	....	1.40	1.32	1.27
37-37.9	1.42	....	1.42	1.34	1.29
38-38.9	1.44	....	1.44	1.36	1.31
39-39.9	1.46	....	1.46	1.38	1.33
40 and above	1.48	....	1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

Column 1:
Humble Oil & Refining Co., 5-21-41, in-

cludes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompson, Sugarland, Thompson, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island, and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-9-42, includes Clinton and Lake Creek.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chacahoula, Cotton Lake, Esperson (below 35° gravity), Fausse Point, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 25°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty, and Vinton.

Column 2:

Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

Column 3:

Pan American Production Co., 5-21-41, includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, includes High Island, Spindletop, Hastings, and South Houston.

Column 4:

Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point, Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

Column 5:

Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Roslyn.

Continental Oil Co., 7-9-41.

Phillips Petroleum Co., 7-9-41.

Column 5 Winkler and Lea:

Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.

Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only.

Column 6 Gray County:

Texas Co., 5-21-41.

H. F. Wilcox Oil & Gas Co., 7-9-41.

Column 7 Lea County:

Magnolia Petroleum Co., 5-21-41.

Column 8 Eddy County:

Continental Oil Co., 5-30-41.

Column 9:

Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.

Column 10 Texas Panhandle:

Humble Oil & Refining Co., 7-9-41.

Column 11 Panhandle:

Sinclair Prairie Oil Marketing Co., 5-23-11.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$0.73	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.75	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.77	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.79	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.81	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.83	....
Below 25	....	$0.80	....	....	....	....	$0.80	....	....	....	$0.83
25-25.9	.82	.82	.82	....	$0.82	....	.82	....	.82	.85	.85
26-26.9	.84	.84	.84	....	.84	....	.84	....	.84	.87	.87
27-27.9	.86	.86	.86	....	.86	....	.86	....	.86	.89	.89
28-28.9	.88	.88	.88	$0.91	.88	....	.88	$0.88	.88	.91	.91
29-29.9	.90	.90	.90	.93	.90	....	.90	.90	.90	.93	.93
30-30.9	.92	.92	.92	.92	.92	....	.92	.92	.92	.95	.95
31-31.9	.94	.94	.94	.97	.94	....	.94	.94	.94	.97	.97
32-32.9	.96	.96	.96	.99	.96	....	.96	.96	.96	.99	.99
33-33.9	.98	.98	.98	1.01	.98	....	.98	.98	.98	1.01	1.01
34-34.9	1.00	1.00	1.00	1.03	1.00	$1.03	1.00	1.00	1.00	1.03	1.03
35-35.9	1.02	1.02	1.02	1.05	1.02	1.05	1.02	1.02	1.02	1.05	1.05
36-36.9	1.04	1.04	1.04	1.07	1.04	1.07	1.04	1.04	1.04	1.07	1.07
37-37.9	1.06	1.06	....	1.09	1.06	1.09	....	1.06	....	1.09	1.09
38-38.9	1.08	1.08	....	1.11	1.08	1.11	....	1.08	....	1.11	1.11
39-39.9	1.10	1.10	....	1.13	1.10	1.13	....	1.10	....	1.13	1.13
40 and above	1.12	1.12	....	1.15	1.12	1.15	....	1.12	....	1.15	1.15

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

Column 1:

Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.

Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

Column 2:

Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41, in Eddy County, New Mexico.

Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum and Gaines counties.

Column 3:

Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.

Column 4 Texas Panhandle:

Magnolia Petroleum Co., 7-9-41.

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
- National lines, 3-26-42 ..... $3.00
- Southwest Penn, 3-26-42 ..... 2.86
- Eureka lines, 3-26-42 ..... 2.50
- Corning grade, 5-27-41 ..... 1.31

Tide Water Associated Oil Co.:
- Bradford, 3-26-42 ..... $3.00
- Allegany, N. Y., 3-26-42 ..... 3.00

Pennzoil Co.:
- Group A, 3-26-42 ..... $2.93
- Group B, 3-26-42 ..... 2.92
- Group C, 3-26-42 ..... 2.91
- Group D, 3-26-42 ..... 2.90
- Group E, 3-26-42 ..... 2.88

Quaker State Oil Refining Corp.:
- In Buckeye lines, 3-26-42 ..... $2.55
- In Eureka lines, 3-26-42 ..... 2.59

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
- Big Sandy River $1.38
- Kentucky River 1.43

Sohio Corp., 5-21-41:
- Birk City $1.32

West Virginia

Pure Oil Co.:
- Cabin and Kelly Creek, 3-27-42 ..... $2.59

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
- Illinois basin, 5-21-41 ..... $1.37
- Eastern Illinois, 5-21-41 ..... $1.23
- Western Indiana, 5-21-41 ..... 1.23

Magnolia Petroleum Co.:
- Illinois basin, 5-21-41 ..... $1.37

Carter Oil Co.:
- Illinois (Louden), 5-21-41 ..... $1.37

Sohio Corp.:
- Illinois basin, 5-21-41 ..... $1.37

Texas Co.:
- Illinois basin, 5-21-41 ..... $1.37

CRUDE-OIL PRICES EFECTIVE MAY 23, 1941

(All gravities above those quoted take highest price offered in that field)

Gravity	Signal Hill (Long Beach)	Wilmington	Seal Beach	Huntington Beach	Inglewood	Olinda-Brea Canyon	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills Midway-Sunset, Lakeview area	Coalinga	Kettleman Hills	Elwood Terrace
14-14.9	....	$0.68	....	$0.71	....	$0.70	$0.70	$0.70	$0.70	$0.72	....	....	....	....	....	$0.73	$0.73	....	....
15-15.9	....	.71	....	.75	$0.76	.72	.72	.71	.72	.72	....	....	....	....	....	.73	.73	....	....
16-16.9	....	.74	....	.79	.79	.75	.74	.73	.75	.72	....	....	....	....	....	.73	.73	....	....
17-17.9	....	.78	....	.82	.82	.78	.77	.76	.78	.72	....	....	....	....	....	.75	.73	....	....
18-18.9	$0.80	.82	....	.86	.85	.81	.80	.79	.82	.74	....	....	....	....	....	.78	.73	....	....
19-19.9	.84	.86	....	.89	.88	.85	.83	.82	.85	.77	....	....	....	....	$0.73	.81	.75	....	....
20-20.9	.88	.90	....	.93	.92	.88	.86	.85	.89	.80	....	....	....	....	.76	.85	.77	....	....
21-21.9	.92	.94	....	.96	.95	.91	.89	.89	.92	.84	....	....	....	....	.79	.90	.80	....	....
22-22.9	.96	.98	$0.88	.99	.98	.95	.93	.93	.96	.87	....	....	....	....	.83	.94	.83	....	....
23-23.9	1.00	1.02	.92	1.02	1.01	.98	.97	.98	1.00	.91	....	....	....	....	.87	.99	.86	....	....
24-24.9	1.03	1.06	.97	1.05	1.04	1.01	1.01	1.02	1.03	.94	$0.99	....	....	....	.90	1.03	.89	....	....
25-25.9	1.07	1.09	1.01	1.08	1.07	1.04	1.05	1.06	1.07	.98	1.02	....	....	....	.94	1.07	.92	....	....
26-26.9	1.11	1.12	1.06	1.11	1.10	1.08	1.09	1.10	1.11	1.01	1.06	....	....	....	.97	1.11	.95	....	....
27-27.9	1.15	1.15	1.10	1.14	1.14	1.11	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	.98	....	....
28-28.9	1.18	1.18	1.15	1.17	1.17	1.14	1.17	....	....	1.08	1.13	1.08	....	....	1.04	1.19	1.00	....	....
29-29.9	1.20	1.21	1.19	1.20	1.20	....	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.02	....	....
30-30.9	1.23	1.24	....	1.23	1.22	....	....	....	....	1.15	1.21	1.15	$1.01	$1.09	1.10	1.28	1.04	....	f.o.b.
31-31.9	....	....	....	....	1.24	....	....	....	....	1.19	1.24	1.19	1.04	1.12	1.14	....	1.06	....	ship
32-32.9	....	....	....	....	....	....	....	....	....	1.23	1.28	1.23	1.07	1.14	1.17	....	1.09	....	....
33-33.9	....	....	....	....	....	....	....	....	....	1.27	....	1.26	1.10	1.17	....	....	1.11	....	$1.22
34-34.9	....	....	....	....	....	....	....	....	....	1.31	....	1.30	1.13	1.20	....	....	1.13	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.22	....	....	....	$1.22	1.28
36-36.9	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....

Standard posts 73 cents for all grades at Newhall, Kern River, Kern Front, McKittrick and Round Mountain.

Gulf Refining Co.:
Illinois basin, 5-21-41 ..... $1.37

Michigan

Simrall Corp., 5-27-41:
Greendale, Porter, Vernon, Crystal, and Wise $1.44
Buckeye, Bentley, Edenville, Beaverton, and Monitor (sweet) 1.42
Freeman, Redding, Lincoln and Winterfield 1.39
Hamilton-Grout 1.29
West Branch-Arenac 1.24
Sohio Corp., 5-1-41:
Bloomingdale-Columbia $1.45
Mid-West Refineries, Inc., 5-1-41:
Kent County $1.38
Pure Oil Co., 5-27-41:
Sherman $1.39
Midland (Midland County) 1.44

ROCKY MOUNTAIN GRAVITY TABLE

Below 29 ..... $0.96
29-29.9 ..... .98
30-30.9 ..... 1.00
31-31.9 ..... 1.02
32-32.9 ..... 1.04
33-33.9 ..... 1.06
34-34.9 ..... 1.08
35-35.9 ..... 1.10
36-36.9 ..... 1.12
37-37.9 ..... 1.14
38-38.9 ..... 1.16
39-39.9 ..... 1.18
40 and above 1.20

Stanolind Oil & Gas Co., 5-20-41, includes Dutton Creek, Midway, and Salt Creek except Tensleep crude, Wyoming.

Sinclair-Wyoming Oil Co., 5-20-41, includes Salt Creek and Lost Soldier, except Tensleep crude, Wyoming.

Continental Oil Co., 5-21-41, includes Fort Collins and Wellington, Colorado.

Wyoming

Ohio Oil Co.:
Rock River (5-20-41) $1.10
Lance Creek (7-1-41) 1.12
Elk Basin and Grass Creek (light) .. 1.00
Stanolind Oil & Gas Co., 5-20-41:
Frannie (light) $0.70
Frannie (heavy) ..... .47
Grass Creek (light) 1.00
Grass Creek (heavy) ..... .50
Hamilton dome ..... .45
Elk basin 1.00
Salt Creek (Tensleep) ..... .6785
Continental Oil Co.:
Big Muddy (5-30-41) $1.08
Lance Creek (9-1-41) 1.12

Montana

Continental Oil Co., 4-1-41:
Cat Creek $1.15

Colorado

Stanolind Oil & Gas Co., 5-20-41:
Iles $1.07
Continental Oil Co., 5-21-41:
Canon City-Florence $1.05

REFINERY OPERATIONS

(Continued from Page 80)

Military operations and war production were responsible for lifting California refinery runs from a daily rate of just under 500,000 bbl. in January 1942 to the all-time peak, averaging more than 710,000 bbl. during the last 4 months of the year. Sustained demand for products and crude on the Pacific Coast at approximately the current rate is assured for most of 1943 with a rise indicated for the last quarter.

Special plants for the production of approximately 420,000 tons of butadiene annually from petroleum hydrocarbons are under construction and will form the nucleus of the nation's synthetic-rubber program. Cost of the special plants, all financed and owned by the Government but operated by refining companies, will be around $500,000,000.

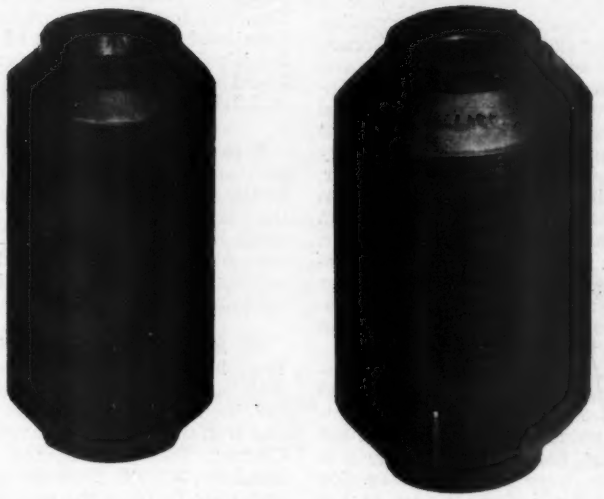
Fourteen refineries are now converting existing facilities for production of 156,860 tons of butadiene annually at a cost of $51,000,000. Cost figures on the 100-octane phase of refinery construction are less exact because of the more varied manufacturing methods and more scattered production of base stock. However, the expenditures will have totaled well over 1 billion dollars when the current goal is attained, including private-company conversion work and the government-financed special plants.

Rising production of natural gasoline and related light petroleum hydrocarbons is exerting increasing influence on refining operations. Butane and isopentane, two of the most valuable hydrocarbons in the production of war materials, are being recovered directly at some of the more modern natural-gasoline plants but there are numerous manufacturers whose equipment is unqualified for more exacting separation and this leaves considerable stock for processing at refineries.

Coal Interests Denied Role in Cities Service Case

WASHINGTON, D. C.—The United Mine Workers of America and certain coal interests last week were denied permission to intervene in the hearing, now in progress in Kansas City, Mo., to determine the reasonableness of the Cities Service Gas Co.'s rates.

Stretch life of drill pipe



Drill pipe is a critical metal. The surest way to make your present pipe give longer life is to equip it with Patterson-Ballagh Protectors, the kind with the extended lips. You not only increase the pipe's life but reduce wear-and-tear on other vital drilling equipment.

See Composite Catalog

PATTERSON-BALLAGH
DRILL PIPE & CASING PROTECTORS

PATTERSON-BALLAGH CORPORATION
Los Angeles Houston New York City

Among the Drilling Contractors

Inadequate Supply of Trained Drilling Crews May Curb Search for Crude

UNLESS relief in the nature of stability of skilled labor is forthcoming soon, oil-well drilling contractors will be unable to continue operations in exploring for new fields, according to testimony presented at last week's hearing at Oklahoma City, Okla., before Senator Reed, member of the Clark committee which is investigating the rationing of fuel oil and supplying of petroleum.

Lloyd Noble, drilling contractor of Ardmore, Okla., made the suggestion that an increase in the price of crude oil would enable producers to stand an increase in cost of drilling contracts, which in turn would be passed on to drilling crews and thus prevent them from migrating to war-industry jobs which might be higher paid. Mr. Noble pointed out that it takes from 3 to 5 years to train an engine man and twice that long to train a driller. This is in sharp contrast to the abbreviated training courses required for a job in a defense industry. He declared that there is no way to speed up the training of drilling crews.

Mr. Noble presented his own record of operation, which showed that in the second quarter of 1942, his 488-man operation actually used 986 men to get the job done, because so many men were leaving his employ to take other jobs or to go to the armed forces. In the third quarter of 1942, his 599-man operation was handled by 722 men.

Another contractor, C. M. Copeland, superintendent for Helmerich & Payne, Inc., Tulsa, told the committee that his firm is running one contract now with 12-hour shifts for drilling crews, because of the shortage of skilled men. Mr. Copeland also spoke of the scarcity of materials and of the delay in procuring maintenance equipment, the shortage of truck drivers and mechanics, repair parts for trucks, the slow-down in truck transportation and higher costs generally.

Brewster-Bartle Drilling Co., Houston, Tex., is near completion of Ohio Oil Co. 2 McDonald Account 2, near Bay City, Matagorda County, Texas, at about 9,100 ft. This contractor recently brought in a gasser, 1 J. E. Pieper, for Adams Oil & Gas Co., in the Yorktown field, De Witt County, Texas. A Wharton County, Texas, wildcat, 1 E. J. Steves, drilled by Brewster-Bartle for Skelly Oil Co., Tide Water Associated Oil Co., and Cities Service Oil Co., has been finished dry at 6,665 ft. Brewster-Bartle has staked location for its own account 1 Lucy Modesett, a Wilcox sand wildcat test east of Shepherd, in San Jacinto County. Projected depth is 8,500 ft.

T. J. Conway, drilling contractor of Kilgore, Tex., was rigging up and preparing to spud M. G. M. Oil Co. 1 A. M. Jeter, in the southeast corner of a 101-acre tract in the J. Forbes League, 1 mile south of Lovelady, Tex. The test is projected to 3,500 ft. Location is 1,600 ft. north of Edd Gillespie's Wilcox pool opener, which found producing sand 13 months ago at 3,214-28 ft.

Rogers Brothers Drilling Co. will drill on its own account the 1 J. H. Bentley, a 1,500-ft. test 1,300 ft. from the west line and 3,125 ft. from the south line of Section 4, C.T.R.R. Survey, Abstract 443, and about 3 miles southeast of Burkburnett, in Wichita County, Texas.

W. B. Omohundro, Wichita Falls, Tex., has been awarded contract to drill a 6,400-ft. rotary wildcat for Continental Oil Co. 2 miles north of the Buffalo Springs Township, Clay County, Texas. It is the 1 T. J. Stephens, 2,043 ft. from the north line and 1,347 ft. from the east line of G. W. Stipps Survey, Abstract 449.

C. C. Gilger, Houston, Tex., has the contract for Phillips Petroleum Co. 1 Wilson, in the Kildare Rodessa lime pool of southern Cass County, Texas, and was awaiting word to start building a road to the site. Gilger drilled the discovery well in the pool. The new test will be in the B. W. Hopson Survey.

O'Neal Drilling Co. (John T. O'Neal) of Lubbock, Tex., has just finished a producing well in the Slaughter pool, Joe Humphrey 1 Carrie Slaughter Dean, on the west side of the field, Cochran County, West Texas. It is estimated that the well will make 1,500 bbl. per day, and O'Neal will drill 12 more wells on the tract.

Henry Schooler, Big Lake, Tex., has finished drilling a producer for Floyd Scott and A. J. Rife in the Noelke pool of Crockett County, West Texas, at 1,305 ft. The well was good for 5,142 bbl. per day from 10 ft. of pay sand.

Ownby Drilling Co., Dallas, Tex., has staked location for a well in the Sugar Creek area of Claiborne Parish, Louisiana.

Harry L. Edwards Drilling Co., Houston, Tex., has the contract for a well in the North Houston field of Harris County, Texas, to be drilled for Kirby Petroleum Co. Projected depth is 7,300 ft. Edwards is at about 5,000 ft. on the 1 Renchie, in the Millican area of Brazos County, which it is drilling for Phillips Petroleum Co.

Olson Drilling Co., Midland, Tex., has drilled to 6,230 ft. on a 9,000-ft. contract for Col-Tex Refining Co. 1 Reed, northwestern Sterling County, Texas, wildcat.

Fred Postelle, Odessa, Tex., is drilling around 7,450 ft. for Ohio Oil Co. at 1 Clark, southeastern Sterling County, Texas, wildcat scheduled to go to 8,500 ft.

Loffland Brothers, Fort Worth, Tex., and Tulsa, are drilling below 8,590 ft. on Shell Oil Co., Inc., 1 Blue, eastern Winkler County, Texas, Ordovician test. Original contract depth was 8,500 ft.

Parker Drilling Co., Tulsa and Houston, Tex., has drilled through the San Andres lime in a wildcat for Barnsdall Oil Co. in northeastern Yoakum County, Texas, and will carry the well to 7,500 ft. At last report the well was drilling below 5,550 ft.

Ungren & Frazier, Abilene, Tex., have taken a farmout from Phillips Petroleum Co. on the Nutt ranch, 25 miles east of Fort Stockton, Pecos County, Texas, and will drill with cable tools to 2,600 ft. in SE NE Section 17, Block 125, T.&St.L. Ry. Survey. Several wells drilled in the area have had shows of oil, but none have yet proved commercial.

George Livermore, Inc., Lubbock, Tex., finished Sharples 1 University in the Barnhart pool, Reagan County, Texas, at 9,158 ft. and is moving rig to the same operator's No. 2 location.

J. M. Wren, Houston, Tex., has the contract for drilling a wildcat, 1 N. A. Stewart, in the Stephen Jones Survey

Keep 'em Turnin'
with **BREWSTER**
Oilbath
SWIVELS
3"-4"-6"
SIZES
50
150
250
TON
CAPACITIES

All Bearings Run
Submerged in Oil

THE **BREWSTER**
COMPANY, INC.
Shreveport, Louisiana, U. S. A.
FOR EXPORT: Acme Well Supply Co.
19 Rector Street, New York City
Brewster employees invest more than 10% in War Bonds.

PROVED IN PEACE—IN WAR

'BESTOLIFE Lead Seal Joint Compound has been used successfully in the Oil and Refining industries for the past fifteen years. During that time, it has proved itself *superior* in protecting threads and in providing tight joints which can be broken out easily.

Today, 'BESTOLIFE has enlisted in the Navy, Merchant Marine and Defense Plants for the duration, and we are proud of this assignment to help in the Victory effort.

But there are still ample stocks of 'BESTOLIFE, available on any priority rating, at supply house field stores in every drilling district in the United States and Canada. Use 'BESTOLIFE Tool Joint Compound for *best* results!

MANUFACTURED BY

I. H. GRANCELL
1601 EAST NADEAU STREET
LOS ANGELES, CALIFORNIA

7 miles southwest of College Station, in Brazos County, Texas, for Vee Tipt Oil Corp. He has staked location for a test for his own account in the Stewart tract, 4 miles southwest of College Station. Mr. Wren has just completed 1 Gibbs Brothers & Co., a dry hole at 7,512 ft., 6 miles south of Huntsville, Tex., for Clyde Tissue. It was in wildcat territory.

A. E. Walker, Big Spring, Tex., has set 8-in. pipe at 1,264 ft. on B. C. Mann 1 Mims, 1,800-ft. wildcat test in western Tom Green County, Texas.

C. J. (Red) Davidson, Fort Worth, Tex., says something ought to be done about the labor situation. If necessary to form a labor pool for drilling contractors to have available manpower, that is the thing to do.

Rowan Drilling Co., Fort Worth, Tex., has reached the Paluxy sand in a south offset to the discovery well at Quitman, Wood County, Texas, in Shell Oil Co., Inc. 1 Goldsmith. Contractor is now coring for the pay below 6,230 ft.

Grace & Grace, Wichita Falls, Tex., has taken over a wildcat test north of the Padgitt pool in northwestern Young County, Texas, and will drill it to 6,000 ft. or production in the Mississippi lime.

Cook Drilling Co. has the contracts for two Wilcox tests which will be drilled for T. L. James & Co., in La Salle Parish, Louisiana. These are the 1 Williams and 2 Williams in 5-7n-3e, both in the Nebo-Hemphill area.

C. C. Gilger Drilling Co. and F. R. Jackson have started a 6,000-ft. test at the 1 Peak, in NW 41-10n-8e, wildcat area in Catahoula Parish, Louisiana.

Glenn H. McCarthy, Houston, Tex., contracted to drill 1 Albert George, on the west side of the Big Creek field, Fort Bend County, Texas, to 7,100 ft., for Angle & Angle, Houston operators, if he did not get into heaving shale. But he did, and the hole was abandoned dry at about 6,700 ft. For his own account Mr. McCarthy is drilling a wildcat, 1 Maco Stewart, in the Hitchcock area of Galveston County.

Arrow Drilling Co., Tulsa, has been awarded contract to drill the Bryce McCandless 1 University, 660 ft. from the south line and 1,980 ft. from the east line of Section 20, Block 26, University Land, Pecos County, Texas. The wildcat test is scheduled to start February 1 and plans call for testing the Ordovician formations. The drilling site is approximately 13 miles northwest of Fort Stockton and about 13 miles southeast of the Apco-Warner pool.

CARE FOR YOUR PUMP FOR YOUR COUNTRY

KEEP 'EM FLOWING

Your Peerless Pump is a precision product. Though it is built ruggedly for years of hard service, regardless of usage, it will last longer, run better, deliver your water supply more faithfully if it has the attention it deserves. Do your part. Care for your pump for your country.

Ready to serve you in case you should need pump parts or pump service is the whole Peerless organization,—manufacturer and dealers. These dealers know your pump,—know how to keep it pumping. Feel free to call on them for service. That's one of the important parts they're playing in the war program. If possible, anticipate your needs for repairs. This kind of cooperation, plus proper maintenance care, plus nationwide service, will protect the performance of your Peerless.

Capacities: 15 to 15,000 g.p.m. in turbine types,—all forms of drive; in other types from 10 to 200,000 g.p.m.

Ask for Literature

PEERLESS PUMP DIVISION
FOOD MACH'Y. CORP.
Factories: Los Angeles, San Jose, Fresno, Calif. and Canton, Ohio

PEERLESS PUMPS

Assembled Liner
Reduced Size

100% HARDNESS UNIFORMITY

is assured with MacClatchie "Money-Saver" Pump Liners . . . Every liner must pass rigid testing method covering *entire inner surface*, which reveals any soft spots that would cause breakdown and premature wear.

Uniform wall thickness on all "Money-Savers"—including reduced sizes—lowers handling weight . . . saves money on export shipments. Wear-free gland can be used over again—you need buy only the liner itself when renewing "Money-Savers." QUALITY is the reason more MacClatchie Liners are in use today than any others!

Write for Descriptive Literature

MacCLATCHIE MANUFACTURING CO.
COMPTON, CALIFORNIA
Mid-Continent Distributor:
HAKE TOOL COMPANY, Houston, Texas
Rocky Mountain Representatives:
MOUNTAIN SALES & SERVICE CO., Casper, Wyoming
Foreign:
GEORGE R. WOODS, 17 Battery Place, New York, N. Y.

FOR VICTORY TODAY AND SOUND BUSINESS TOMORROW

Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

Think what 10% of the national income, saved in War Bonds now, month after month, can buy when the war ends!

For Victory today . . . and prosperity *tomorrow,* keep the War Bond Pay-roll Savings Plan rolling in *your* firm. Get that flag flying now! Your State War Savings Staff Administrator will gladly explain how you may do so.

If your firm has not already installed the Payroll Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write or wire: War Savings Staff, Section F, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

Save With

War Savings Bonds

This Space Is a Contribution to America's All-Out War Program by

THE OIL AND GAS JOURNAL
211 SOUTH CHEYENNE, TULSA, OKLAHOMA

PERSONALS

John R. Moran, Denver, Colo., has become vice president and counsel for Manning & Martin, Inc., drilling contractors. Mr. Moran has had a wide experience in the oil business in the Texas, Mid-Continent and Rocky Mountain areas where he was identified with several major companies, including Shell and Continental.

Capt. Clifton A. Coom, formerly a member of Humble Oil & Refining Co.'s civil engineering staff in Houston, Tex., is a prisoner of war, interned by Japan in the Philippine Islands. Captain Coom was the subject of news dispatches a year ago when he directed American and Filipino troops in annihilating a "suicide" detachment of Japanese on Bataan.

B. P. Walts, formerly district engineer for Sinclair Prairie Oil Co. at Delaware, Okla., has been transferred to the purchasing department of that company at Tulsa.

Shelby L. Surratt, formerly pipeline gager for Pan American Pipe Line Co. in the Hastings district, Brazoria County, Texas, has begun flight training at Goodfellow Field, San Angelo, Tex., after having completed primary training at the Coleman flying school. Before joining Pan American 3 years ago Aviation Cadet Surratt was employed for 5 years by Humble Oil & Refining Co. in Houston, Tex.

Duncan Neblett, for the past 2 years secretary and corporation judge for the city of Houston, Tex., left that dual office January 2 to join Eastern States Petroleum Co. as assistant to the president. Eastern States operates a refinery on the Houston Ship Channel and is engaged in other phases of defense production.

A. S. Rhea, Sun Oil Co. engineer at Kilgore, Tex., has been transferred to the Corpus Christi area. Recently Mr. Rhea was on loan to the East Texas Salt Water Disposal Co. as superintendent of operations.

W. K. Holmes, Sr., refinery superintendent for the Texas Co., is in Hot Springs, Ark., for a general checkup and rest. Mr. Holmes has been in charge of the company's West Tulsa refinery since 1934 and previous to that was stationed in Port Arthur, Tex., and Los Angeles, Calif., where the company operates refineries.

Harry Schaller, employed in the Cities Service Gas Co. valuation department at Bartlesville, Okla., for 4 years, has been transferred to the Ponca City, Okla., refinery of Cities Service Oil Co., where he becomes foreman of the power plant. **W. L. Walker,** former junior engineer, who has been in charge of the Ponca City power plant for several months, has been assigned to special engineering studies in the maintenance and construction department.

Ralph Damp, formerly manager of the Carter Oil Co.'s eastern division, with headquarters at Mattoon, Ill., has been appointed northern division manager of the company with headquarters at Cut Bank, Mont. He is in charge of the producing and refining properties of the Santa Rita Oil & Gas Co. which recently were acquired by the Standard Oil Co. (New Jersey).

A. J. Douglass has been elected president of Esther Oil Co., Bradford, Pa. **James R. Evans** and **E. J. Conwell** are vice presidents; **C. M. Brooder,** secretary and treasurer, and **James J. Shea,** lease superintendent.

L. H. Dial has been promoted to superintendent of the East Texas Salt Water Disposal Co. Previously, he was assistant superintendent. A graduate of Georgia Tech in 1930, Mr. Dial spent 10 years with the Stanolind Oil & Gas Co., the last 7 years of his tenure with that company being spent in salt-water disposal work exclusively. He is married and has one child and now lives in Kilgore having moved there in November.

GEORGE J. O'BRIEN

Banking Mixed With Oil in This Native Son's Career

GEORGE J. O'BRIEN, assistant to the president and ranking Los Angeles executive of the Standard Oil Co. of California, has added banking to his other industrial accomplishments. He became a member of the board of the California Bank, following the December meeting of the directors.

Just a year ago Mr. O'Brien was appointed assistant to the president of Standard of California as well as Los Angeles representative of the board of directors and chairman of the company's committee of executives at that city. Previously, he had been treasurer of the company with headquarters at San Francisco, having risen to high office through the manufacturing and other operational divisions.

His career with Standard of California started in 1916 when he went to work as a sailor on one of the company's tankers. After serving as an ensign in the U. S. Navy in World War 1, he resumed his career with the company in San Francisco and Los Angeles. He is a native of San Diego and a graduate of the University of California.

Interest in banking may have been inherited from his father, G. N. O'Brien, former president of the American National Bank of San Francisco.

Mr. O'Brien long has been active in civic affairs. He is a director of the All-Year Club of Southern California and of the Los Angeles Area War Chest, as well as a member of the

budget committee of the latter organization. He is a member of the California Club, Annadale Golf Club, Newport Harbor Yacht Club and Los Rancheros Visitadores.

W. T. Ziegenhain, who recently resigned as refinery editor of The Oil and Gas Journal has joined the special products division of the Phillips Petroleum Co. His headquarters will be at the Bartlesville, Okla., offices of the company. He joined the Journal staff in 1926 after spending 4 years in the manufacturing department of the Empire Refineries, now a part of the Cities Service Oil Co. Previously he had received a degree in chemical engineering from Iowa State University. During the 16 years he was a member of the Journal staff he specialized in engineering writing and is particularly well known among petroleum refiners and natural-gasoline manufacturers in all parts of the United States.

C. E. Bermudez, chief chemist of the refining division of Petroleos Mexicana, Mexico City, D.F., is visiting points in Texas, Oklahoma and the eastern part of the United States. His company is owned by the government and operates the refineries and other properties either purchased from private companies or expropriated in 1938.

C. R. Bickel, Kansas division manager for Shell Oil Co., Inc., Wichita, will be transferred to Centralia, Ill., as eastern division manager, effective March 1. **E. W. Clark,** Tulsa, Oklahoma division manager, will succeed Mr. Bickel and **E. E. Davis,** Mid-Continent drilling superintendent, will assume the additional duties of Oklahoma division manager.

Dr. Willard N. Holmes, primary examiner for 15 years in the mineral-oil section of the U. S. Patent Office, has resigned his government position and is now engaged in private practice concerning petroleum patents at Washington, D. C. Before entering the patent office, Dr. Holmes was professor of chemistry at the University of Chattanooga.

W. A. Kirk, one of the founders of California Natural Gasoline Association, recently was appointed to serve as a member of the Newport Beach (Calif.) city council to fill the unexpired term of **Robert Allen,** resigned, who is now an assistant deputy petroleum administrator. It is his first political venture. During his entire business career, Mr. Kirk has been in the oil business. Now an oil producer, he was at one time a manufacturer of natural gasoline.

W. A. Fisher, Bartlesville, Okla., assistant manager of Empire Pipeline Co., and the storage division of Cities Service Oil Co., has accepted a temporary assignment with the Transportation Division, Petroleum Administration for War, Washington, D. C. **Harry Nelson,** general superintendent, has been assigned Mr. Fisher's duties. **P. O. Teter,** assistant general superintendent, will take over Mr. Nelson's duties. **J. W. Fagan,** district superintendent at Gladewater, Tex., will be moved to Bartlesville to assume the present duties of Mr. Teter. **J. P. McInerney,** formerly assistant district superintendent at Oklahoma City, will replace Mr. Fagan at Gladewater.

Ralph P. Copley, of the California Co., was elected president of the Rocky Mountain Association of Petroleum Geologists at its annual meet-

AERIAL PHOTOGRAPHIC MAPS
REGIONAL MAPS
FEE OWNERSHIP MAPS
TOPOGRAPHIC MAPS BY MULTIPLEX METHODS
Civil Engineering in map construction by Photogrammetric Methods
JACK AMMANN
D B A
KARGL AERIAL SURVEYS
Fannin 5168 San Antonio, Texas

ROTARY DRILLING HANDBOOK
by J. E. Brantly. 1942 edition ... $5.00

PETROLEUM PRODUCTION
by Wilbur F. Cloud $5.00

AERIAL PHOTOGRAPHS, Their Interpretation and Use,
by A. J. Eardly $2.75

PETROLEUM PRODUCTION ENGINEERING
by Lester C. Uren, Vol. II $6.00

GEOPHYSICAL PROSPECTING FOR OIL
by J. L. Nettleton $5.00

FIELD GEOLOGY
by Frederick H. Lahee.
4th Edition, 1941 ..... $5.00

FLUSH PRODUCTION . . . The Epic of Oil in the Gulf Southwest.
by Gerald Forbes $2.75

You may order any of these books with the privilege of returning within seven days for an exchange or refund. Send your order and remittance to:

BOOK DEPARTMENT
The Oil and Gas Journal
Tulsa, Oklahoma

ing in Denver, Colo. **C. E. Erdman,** of the U. S. Geological Survey, was chosen first vice president; **John Blixt,** of the Texas Co., second vice president, and **Robert E. Spratt,** of the U.S.G.S., secretary and treasurer.

E. B. Germany, Dallas, Tex., oil man was chosen potentate of the Hella Temple Shrine last week Mr. Germany is also a captain in the Coastal Air Patrol and chairman of the state Democratic committee.

C. E. Shoenfelt, petroleum engineer of Denver, Colo., was able to return to his office the past week following a prolonged illness.

Shifts: **Gerald Henny,** engineer, Henry & Whitmore, Los Angeles to U. S. Customs Guard, San Pedro, Calif.; **H. L. Davis,** superintendent, Williams Brothers Corp., Flora, Ill., to Greensboro, N. C.; **G. D. Putnam,** geologist, Lario Oil & Gas Co., Wichita, Kans., to Midland, Tex.; **L. S. Wright,** superintendent, Globe Oil & Refining Co., McPherson, Kans., to Zionsville, Ind.; **H. B. Maust, S. S. Giezendanner** and **A. E. Berndes, Jr.,** engineers, Texas Co., Marksville, La., to Jackson, Ala.; **Ernest W. Thiele,** engineer, Standard Oil Co. (Indiana), New York City to Whiting, Ind.; **Charles A. Dillard,** superintendent, Carter Oil Co., Plaquemine, La., to Magnolia, Ark.; **W. H. Fitzgerald,** vice president, Petroleum Exploration Co., Columbus, Ohio, to Southern Pines, N. C.; **H. Boyd Morris,** engineer, Home Oil & Refining Co., Scott City, Kans., to Denver, Colo.; **Mark H. O'Connell,** geologist, Cities Service Oil Co., Amite, La., to Livingston, Tex.

A. N. Hendrickson, president of Landreth Co., Midland, Tex., has been appointed chairman of the Midland County Red Cross War Fund Campaign. Mr. Hendrickson has been with the Landreth company for 20 years.

Charlton T. Wood, who has been division scout for Shell Oil Co., Inc., in the Ventura district of California, has been promoted to engineer in the production department and will maintain headquarters at Bakersfield.

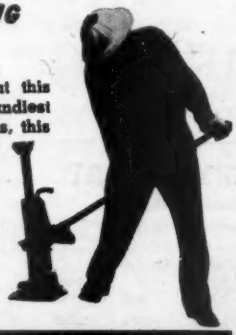
P. Stesart Noland has been promoted to production geologist for the Skelly Oil Co. in the West Texas-New Mexico office at Midland, Tex., For the past 5 years he has been scout for Skelly in the area. Prior to coming to Midland he was production geologist for Skelly in Oklahoma and North Texas. Mr. Noland is a graduate of the University of Oklahoma, holding a bachelor of science degree in geology.

C. T. Carnes, secretary and treasurer of American Republics Corp., was chosen senior warden of Christ Episcopal Church, Houston, Tex., last week. **John R. Suman,** vice president and director of Humble Oil & Refining Co., was elected a vestryman. **A. L. Selig,** manager of the exploration department of Stanolind Oil & Gas Co.'s Gulf Coast division, is a vestryman in the same church.

M. L. Benedum, one of the industry's mostly widely known operators, said last week at his Pittsburgh, Pa., home that the proposed limit of $25,000 on incomes will force churches, schools and charities to turn to the Government for aid and thus become "creatures of partisan politics." His observation was based on inability to make his usual contribution to Geneva College at Beaver Falls, Pa., pending a congressional decision on income limitations.

"CAN DO ALMOST EVERYTHING BUT CLIMB A RIG!"

THAT'S what one rigger boasted about this new Buda 2215-S Oil Field Jack, the handiest tool in the field. For loads up to 15 tons, this versatile jack offers dozens of *safe* ways to lift, lower or line up equipment that save you time and money!



BUDA *Oilfield* JACKS

- SAFER
- FASTER
- LAST LONGER

THE BUDA CO., Harvey (Chicago Suburb) Ill.

OIL FIELD JACKS FROM 1 TO 100 TONS
OIL FIELD ENGINES FROM 20 TO 340 H. P.

STANDARD OF THE OIL FIELDS

Gotkool

WATER CANS & COOLERS

GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. GOTT Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today! . . . . .

H. P. GOTT MFG. CO.
WINFIELD, KANSAS

KEEP PURE DRINKING WATER ALWAYS HANDY

INSIST ON THE GENUINE

Look for the Blue and Black Label with the name GOTKOOL in Red.

Changed your ADDRESS?

If you have moved and have not notified THE OIL AND GAS JOURNAL, please use this form so we can get your copies to you promptly.

NAME .....

OLD ADDRESS .....

.....

NEW ADDRESS .....

.....

COMPANY ..... TITLE .....

Mail to: Circulation Department
The Oil and Gas Journal Tulsa, Oklahoma

Market Developments

East Coast

NEW YORK.—Action of the Petroleum Administration for War in banning tank-car shipments of gasoline into District 1 and limiting them to fuel oil and crude should result in the largest step toward solving the burning-oil supply situation of any that has so far been undertaken. Previously about 55 to 60 per cent of the petroleum brought into the East Coast area consisted of refined products. If 55 to 60 per cent of the 750,000 bbl. per day which are now being brought in is confined to kerosene, light and heavy fuel oil, the total would be 425,000 to 430,000 bbl. per day or close to 13,000,000 bbl. per month. In January, 2 years ago, the total deliveries of oil products in this range from the Gulf to East Coast amounted to 16,500,000 bbl. Therefore, if deliveries are maintained at the 13-million level and existing restrictions are retained, an improvement in the supply should result.

It became apparent last week that the proposed priority list of fuel-oil consumers probably will not be issued despite the plea from distributors for some official basis for alloting supplies. It is probable that the exclusion of gasoline from tank-car shipments will eliminate the need for such a list.

Meanwhile, distributors face a problem in allocating supplies because they are not permitted to deny any consumers even though they know that more essential demands exist.

Mid-Continent

URGENT calls for fuel oils of all grades resumed this week in the Mid-Continent petroleum market as distributors sought to maintain customer service under difficult transportation conditions. Inquiries for fuel oil and shipping instructions issued to Mid-Continent refiners slackened off temporarily at the end of last week but return of subfreezing temperatures again stimulated calls.

There is no positive indication yet available on how seriously the ban on tank-car shipments of gasoline into the East Coast area will react on Mid-Continent refinery operations. However, plant operators predicted that a sharp swing will be necessary in manufacturing if serious maladjustment of inventories is to be avoided.

Interior refiners have been the least affected by previous directives and programs for lowering the production of gasoline and lifting fuel-oil recoveries. Ability to maintain refinery operations with minimum adjustments during the past 12 months has been largely because of motor-fuel shipments to the East Coast, absorbing supplies customarily not needed there. With the eastern outlet now denied gasoline made in the interior and with the full pressure of nation-wide rationing just now apparent, sharp changes in Mid-Continent refinery operations appear inevitable.

Natural-gasoline manufacturers report that adjustments are being made in shipments in order to place supplies in the hands of those refiners permitted to deliver motor fuel to the East Coast. Prices are steady and total demand appears to be keeping pace with production, although, since last Thursday, a rather drastic shuffling of delivery schedules has been made.

Gulf Coast

HOUSTON, Tex. — Small independent refiners are the chief sufferers from the new petroleum administrative order forbidding shipment of gasoline to the East Coast from outside districts. Only the large refiners, with flexible operating facilities and abundant storage capacity, can meet, without serious loss, the conditions imposed by the order.

Small refiners will have no difficulty in disposing of products which still can be delivered to the East Coast, but apparently they will have to market their gasoline in nearby territory. They say they will have to reduce their runs to stills.

Opinion held in this region is that the new order will be rescinded in a relatively short time, since it obviously is designed to give the East the fuel oil for which it is begging and let that territory make a further reduction in its consumption of gasoline.

No price changes were announced in the past week, and all oil products were firm. Gasoline, which many predicted would be searching for buyers after rationing got under way, was itself an object of search. At least one marketer turned down an order for 100 cars because he had not been able to fill shipping instructions already in hand. Kerosene and No. 2 fuel oil were extremely tight.

A.P.I. REFINERY REPORT

Week Ended January 16, 1943

(Figures in thousands of barrels.)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	160	2,829	495	708
Ind., Ill., Ky.	728	17,150	2,480	5,220
Okla., Kan., Mo.	318	7,051	1,377	1,619
Censored area*	1,633	37,203	11,635	19,821
Rockies	101	1,707	554	359
California	700	19,015	55,257	12,114
Total 1-16-43	3,640	84,955	71,798	39,841
Total 1- 9-43	3,674	84,245	72,559	41,367
Total 1-17-42	3,722	98,511	91,441	44,534

Note: Refinery runs and stocks for week ended January 23, 1943, appear on Trends page.

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
January 16, 1943	232,647,000
January 9, 1943	232,191,000
January 17, 1942	246,287,000

*Excludes heavy, unrefinable stocks in California.

Pacific Coast

LOS ANGELES, Calif. — Very little trading was reported this week primarily because of the reduced number of independent refiners operating. Current low prices in the retail trade for gasoline are an effective ceiling on what can be paid for motor fuel in the spot market and as a result the small quantity moving on spot sales has been in the lower brackets.

Fuel-oil demand, which has been increasing from month to month for over a year, is selling at the ceiling price and would go higher but for restrictions. Gas oil, which is in good demand, is likewise moving, although in much smaller volume, at the ceiling price. There is a ready market for all available gas oil which will be used for blending purposes to make 25-viscosity fuel. Fuel-oil demand for 1942 was the highest ever attained and all indications point to a new record this year.

A total of 5,063 Pacific Coast service stations closed during 1942, and this list will continue to grow. This represents about 20 per cent of all stations operating prior to the war. Many of the closed stations were marketing gasoline produced by independent refiners. As a result, many independently operated refineries in southern California have been closed down and will remain on the inactive list for the duration. In California, a total of 3,480 service stations have been closed since Pearl Harbor. Other Pacific Coast states show similar conditions. Washington has 703 idle service stations, Oregon 461, Arizona 319 and Nevada has 100 closed stations. The percentage of service stations closed is approximately the same as the decline in taxable-gasoline sales.

Refinery Prices

(Prices as of January 26)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast‡	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.250-6.500	6.125-6.250	5.750-6.000	5.125-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	3.875	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125	.....	.....	.....	.....	.....
California	.....	2.750-4.000	.....	.....	‡$1.35-1.45	$0.85-0.90
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85
Northeast Coast	.....	.....	.....	6.800	2.780	1.65
North Louisiana	.....	.....	.....	.....	.....	†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	$0.80
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil
(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
680-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.100
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	9.80
Burlington, Vt.	16.90	5.50	10.10
Buffalo, N. Y.	16.20	5.50	10.80
Dover, Del.	16.70	5.50	12.00
Hartford, Conn.	15.60	4.50	9.70
Manchester, N. H.	17.30	5.50	10.80
Newark, N. J.	15.20	4.50	9.70
New York, N. Y.	16.10	5.50	9.80
Philadelphia, Pa.	16.20	5.50	11.05
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.90
Providence, R. I.	15.00	4.50	9.00
Washington, D. C.	15.20	4.50	11.00
Average 14 cities	16.02	5.14	10.49

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co., and Texas Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.30	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	‡9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.00
Average 11 cities	18.34	7.50	10.46

*Includes 1-cent state tax.
‡Includes ½-cent state tax.

MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.00	10.00
Boise, Idaho	20.10	6.50	14.50
Casper, Wyo.	17.00	5.50	13.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Com-bined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.55	5.96	10.76

Equipment Progress

Buckeye Traction Ditcher Celebrates Fiftieth Birthday

When the world's Columbian Exposition was preparing to open in Chicago 50 years ago, the first Buckeye ditcher was being completed in a tiny shop in Bowling Green, Ohio. James B. Hill, its designer and builder, thus became the founder of the Buckeye Traction Ditcher Co. of Findlay, Ohio, one of the largest and best-known manufacturers of trenching machinery in the world.

This forerunner of the modern Buckeye ditcher was of wheel type and was built without engineering drawings or designs. All patterns were made of wood and most of them were carved out with a jack knife. This initial ditcher of half a century ago sold for $700 and netted Hill a salary of approximately $3 per day for his time and genius.

In its 50 years of progress, the applications of the Buckeye ditcher have been highly varied. It was originally built for laying drain tile on farms, but soon demonstrated its value for digging trench for many other purposes. With the growth of cross-country pipe lines, Buckeye came into its own for here was a job that could be performed in no other way.

TRADE LITERATURE

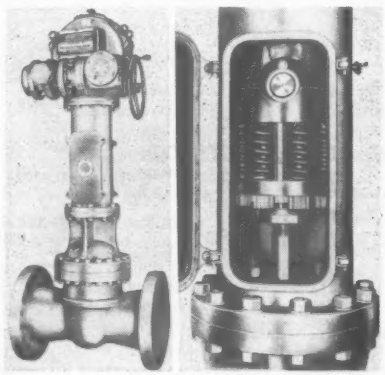
Solvay Sales Corp., 40 Rector Street, New York, N. Y.—A 30-page catalog, with full-color cover well organized for ready reference. It gives specific information on forms, and the chemical and physical properties of Solvay products and their uses. In addition to product information there are short chapters on safety methods, on dissolving caustic soda and caustic potash and how to utilize Solvay technical service.

Worthington Pump & Machinery Corp., Harrison, N. J.—Two bulletins, S-550-B21 and W-350-B2C, the former on vertical four-cycle totally enclosed CCG gas engines, and the latter on Antaciron centrifugal pumps, Types CR and CU, for handling acids and acid slurries.

A. M. Byers Co., Pittsburgh, Pa.—An unusually colorful and easy-to-read new technical bulletin entitled "Wrought Iron for Underground Services." The bulletin is designed to be of service to private and municipal water-works engineers, oil and gas operators, plant-maintenance men and others. It discusses the most important factors of soil corrosion of underground piping, weighs theory against test results and outlines installation histories of various types of lines.

New Type Valve Control

Philadelphia Gear Works, Erie Avenue and G Street, Philadelphia, Pa., has introduced a new-type valve control, which it calls Limitorque. The



valve operator has a different principle of actuation that is said to make it especially suited for use on catalytic cracking, hydroformer and similar cycling-plant valves ranging from 3 to 24-in. diameter. In the type S. C. Limitorque a crank mechanism opens or closes a valve three times faster than the conventional-type operator. It can be used on gate, globe or angle valves. It avoids application of impact loads to disk and seating surfaces of valve. Setting for light or heavy seating is easily achieved simply by adjusting one stud. It requires only one switch, and it is provided with a hand wheel for manual operation that drives through differential gearing so motor is always engaged.

Allis-Chalmers Promotes Haas and Moore

Oscar A. Haas, for the past 6 years district manager for Allis-Chalmers Manufacturing Co., in Oklahoma and western Arkansas on all of the company's products except farm machinery, will be moved to the company's headquarters at Milwaukee, Wis., early in February to become assistant manager of a division. Mr. Haas has been with Allis-Chalmers since 1915, except for 1 year which he spent as chief engineer with Bethlehem Supply Co.'s predecessor, Oklahoma Iron Works, in Tulsa. He has worked through various positions, including draftsman, designer, sales engineer and office manager.

R. I. Moore, now engineer at the Tulsa office, who has been with the company for 20 years, will become acting manager and will take over the duties formerly handled by Mr. Haas.

Blackmer Builds New Pump; Appoints Sales Representative

A new rotary pump, vertically mounted and powered by a 15-hp. gearhead motor, is now being built by Blackmer Pump Co., Grand Rapids, Mich. Practically all of these pumps are going into marine construction and they are being built to meet full Navy specifications. However, due to the small floor space required for mounting, this same unit has been adapted for use in industrial plants requiring the transfer of oils and other nonabrasive liquids.

Appoint Representative

The appointment of Power Machinery Co., of which Egon Koehler is president, as Blackmer Pump Co. sales representatives in Oklahoma and western Arkansas, has been announced by J. B. Trotman, general sales manager of the Blackmer company. Mr. Koehler maintains offices in Tulsa, and operates a branch in Houston, Tex., in charge of F. F. Dietterich.

Navy "E" Award Renewed For Six Months

Union Wire Rope Corp., Kansas City, Mo., has been granted a renewal for another 6 months of the Navy "E" Award. Notification of the renewal was made last month to M. G. Ensinger, president of Union Wire Rope Co., in a letter from Rear Adm. George H. Rock, U. S. Navy (retired), chairman of the Navy board for production awards.

New Office Opened

National Cylinder Gas Co. (Pacific Coast) announces the opening of a new office and stock room located at 326 Howard Street, San Francisco, Calif.

Complete stock of Hollup "Sureweld," welding electrodes, a.c. and d.c. welding machines, Torchweld oxyacetylene welding and cutting equipment and a complete line of welding accessories will be stocked at this new location.

Manufacturers Spur Drive to Recover Pump Parts Containing Scarce Alloys

ALL of the manufacturers of subsurface oil-well pumps on the Pacific Coast are cooperating fully in the Government's campaign for collecting used seats, balls and companion subsurface pump parts containing scarce alloys, such as stainless steel, tool steel, nonferrous metals, etc. The drive, initiated by H. M. Kent, chief of the Salvage Section, Office of Petroleum Administrator for War, was officially begun on January 1, 1943.

The western manufacturers have agreed to act as central collection agents and are doing everything possible to inform producers, distributors, and supply stores of the drive. In contacting with those who have used parts or who will help in the collection, the manufacturers are stressing the urgent need for turning in seats and balls so that scarce alloys will be available for making essential replacement parts. It is being pointed out that the nearer the petroleum industry comes to recovering 100 per cent of its needs as a result of the drive, the more inclined the War Production Board will be to grant 100 per cent of the industry's requirements.

Producers are being asked to turn in all worn parts on hand immediately instead of holding them. To discourage retaining excessive quantities of old parts until a comparable number of new parts are ordered, a "credit" plan has been established similar to the now famous tooth-paste tube plan. No monetary credit will be involved but "unit credit" will be given for salvaged parts contributed. Under this plan notations will be made of the balls, seats, and other parts turned in by each producer. In effect, this system will allow a producer to secure one new part when needed for every used part for which he has received credit by previous salvage.

Mr. Kent related the absolute necessity for such a drive to the various manufacturers on November 11, 1942, and asked for their suggestions. He pointed out that participation in a program of this type was the petroleum industry's patriotic duty. After considering their replies, the following points were proposed as a basis for organizing and conducting the campaign:

Functuations of the Manufacturer

1. To act as a central collection point for all alloyed parts gathered in the drive.

2. To maintain a record of the volume of scrap alloy material recovered in the drive, as a means of augmenting the supply of metals utilized in the manufacture of new parts; and to keep the Office of Petroleum Administrator advised periodically of these quantities.

3. To segregate the parts by alloy content, advising the Office of Petroleum Administrator periodically of the quantities on hand so that appropriate steps can be taken by the War Production Board to facilitate the movement of the materials to the proper remelting points.

4. To absorb any costs involved in the collection, segregation, and disposition of materials not otherwise recovered in the transaction.

Functions of the Jobber or Distributor

1. To set up a method of extending "unit credit" to the supply stores for the number of balls, seats, etc., turned in, to apply against future purchases of new balls and seats.

2. To prepare a letter to outlets advising them of the drive, outlining the procedure for conducting the drive, and soliciting their wholehearted cooperation in this program.

3. To arrange for the shipment of scrap parts from the primary collection points (the supply stores) to the central collection points (the manufacturers).

4. To absorb any costs incurred in the collection drive.

Functions of the Supply Store

1. To act as a primary collection point for worn pump parts containing scarce alloys.

2. To set up a method of extending "unit credit" to customers for the number of worn balls, seats, etc., turned in.

3. To work with jobber or manufacturer in arranging for frequent consignment of worn parts on hand.

4. To encourage by word of mouth and otherwise, the full active cooperation of all producers in this collection drive.

B & W Refractories Division Gets Army-Navy "E"

Babcock & Wilcox Co.'s works in Augusta, Ga., has been awarded the Army-Navy "E" for outstanding production of refractories.

The award ceremonies were held in Augusta on January 22. Rear Admiral Clark Howell Woodward, U.S.N. (retired), chief of the Incentive Division of the Navy, officially presented the "E" pennant to A. G. Pratt, president of the company. Col. Herbert W. Schmid, U.S.A., commanding officer of Camp Gordon, Ga., presented the "E" pins to employes representing the plant personnel. W. D. Page, mayor of Augusta, acted as master of ceremonies.

Previously, B & W's Barberton (Ohio) works received the Navy "E," the Maritime "E" and the Army-Navy "E."

Monsanto Names Plant For Company's Founder

In honor of the memory of the founder and first president of Monsanto Chemical Co., the board of directors has decreed that the St. Louis plant of the Organic Chemicals Division of the company will henceforth be known as the John F. Queeny plant. The announcement was made recently at a ceremony at which the plant received the Army-Navy "E" Production Award.

The John F. Queeny plant is on the site of the company's original plant which was started in St. Louis in 1901 by Mr. Queeny to manufacture saccharin.

John F. Queeny served as president of Monsanto until 1928 when he was succeeded by his son, Edgar Monsanto Queeny. He continued as chairman of the board until his death in 1933.

Will Conduct Foremanship Class at Houston

E. J. Dujay, superintendent of the early-morning shift at the Hughes Tool Co. plant in Houston, Tex., is to be general supervisor of a course in foremanship and industrial supervision in that city under the sponsorship of Texas A. & M. College, cooperating with the U. S. Office of Education. The course will cover various phases of work coming under a foreman's direction. Emphasis will be placed on safety and health measures.

Bucyrus-Erie Awarded Second Army-Navy "E"

The Army-Navy "E" award was presented to the Erie works of Bucyrus-Erie Co. on January 16. Previously, the company's South Milwaukee plant had received the same distinguished honor for production achievement.

Col. John S. Seybold, chief of the Army Procurement Branch, Supply Division, Office of the Chief of Engineers, presented the banner. W. L. Little, manager of the Erie works, accepted the award on behalf of the company.

Among Equipment Men

Hartmann, Vernon Elevated By John A. Roebling's Sons

E. G. Hartmann has been promoted to assistant general manager of sales of John A. Roebling's Sons Co., Trenton, N. J.

Mr. Hartmann's entire business career has been in the steel industry.

E. G. HARTMANN

D. W. VERNON

In 1941 he was promoted from manager of round wire and flat wire specialties division to assist the general manager of sales.

Douglas W. Vernon, previously chief of the priorities division, has been made assistant to the general manager of sales.

Mr. Vernon's entire experience of 20 years has been with the Roebling Co., by whom he was employed in their Chicago branch after attending University of Chicago.

Grizzly Mfg. Co. Executive On Extended Trip

Walter G. L. Smith, president of Grizzly Manufacturing Co., Los Angeles, Calif., is on an extended business trip to Washington and various eastern manufacturing centers, in connection with the company's increased activities in the production of rubber products for aviation and industrial purposes. Mr. Smith expects to spend several weeks in the eastern territory and at the company's new manufacturing plant in Paulding, Ohio, stopping for brief visits at their Mid-Continent and Gulf Coast branches on the return trip.

Haubegger Heads Houston Office, Republic Steel Corp.

The appointment of E. E. Haubegger as district sales manager for Republic Steel Corp. in Houston, Tex., has been announced by N. J. Clarke, vice president in charge of sales.

Prior to joining the Houston sales force in 1936, Mr. Haubegger was for 7 years assistant district sales manager for Republic Supply Co. in the same city. He became assistant district manager for Republic Steel in 1940. He succeeds Gordon F. Hess, who was recently named district sales manager for Republic in Detroit, Mich.

Prior to going to Houston Mr. Hess was assistant manager of sales of Republic's Alloy Steel Division. He entered the steel business in 1917 in the metallurgical department of Central Steel Co., which later became a part of Central Alloy and in 1930 was incorporated in Republic.

Guise Named Vice President Of duGas Engineering Corp.

Arthur B. Guise, formerly engaged in fire and safety engineering for the United States Rubber Co., has joined duGas Engineering Corp. as vice president in charge of development.

Mr. Guise was employed by Factory Mutual Laboratories from 1935 to 1941. In this organization he was engaged in the special hazard phases of fire-protection engineering as well as being responsible for the examination and test of first aid fire extinguishing equipment.

He is a member of the American Petroleum Institute and the National Fire Protection Association. Formerly a member of the committee on flammable liquids for the N.F.P.A., he is now a member-at-large of the committee on hazardous chemicals and explosives, and special extinguishing equipment.

Ravanell to Continental Motors

Ben H. Ravanell, formerly with Oil Well Supply Co. and Guiberson Co., is now connected with Continental Motors Corp., Garland, Tex., as superintendent of assembly and test of tank engines.

Trumbull Vice President Of Greene, Tweed & Co.

O. W. Trumbull, formerly of Asbestos Textile Co., is now connected with Greene, Tweed & Co., of New York, and was appointed vice president and general manager of that corporation at a meeting of the board of directors, Tuesday, November 24, 1942.

Mr. Trumbull brings to Greene, Tweed & Co. many years of experience in the asbestos textile and packing fields.

Cooper-Bessemer Assigns Mettling to West Coast Branch

Philip W. Mettling, Cooper-Bessemer Corp. compression expert, stationed at the corporation's Mount Vernon, Ohio, plant for the past several years, has been transferred to the firm's branch office at 640 East Sixty-first Street, Los Angeles, Calif. He will continue his work as a compressor calculation engineer. His transferment will bring him in closer contact with the field in that important area, thus expediting the installation, operation, and servicing of Cooper-Bessemer compressors.

Beaver Pipe Tools, Inc., Elects Officers

W. A. Neracher, founder of the Beaver Pipe Tools, Inc., 43 years ago and president during this entire period, was recently elected to a newly created position as chairman of the board. W. A. Phillis, formerly vice president, became president and general manager; M. W. Bechtel, executive vice president and treasurer; C. W. Shafer, vice president, manufacturing; E. R. Barkley, vice president, sales; and R. C. Mellinger, vice president, accounting.

Beaver Pipe Tools, Inc., manufactures machines and hand tools for cutting and threading pipe, bolts, conduit, etc.

Bucher Heads Purchasing Department

C. D. BUCHER

Dayton Rubber Manufacturing Co., Dayton, Ohio, has appointed C. D. Bucher as director of purchases, to succeed J. C. Cunningham, who has resigned. Mr. Bucher brings to his new position 15 years' experience, having served two of the Akron rubber companies in the capacity of purchasing agent and buyer of engineering materials. He is a graduate of Ohio State University in mechanical engineering, and a past president of the Akron branch of the National Purchasing Agents Association.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED RATE

8 CENTS A WORD, minimum charge $2 per insertion.

SITUATIONS WANTED. 4 cents a word, minimum charge $1.

BOX NUMBERS, count 9 words when replies are to be sent to our Tulsa Office.

10% DISCOUNT if 3 insertions are ordered at one time, with check accompanying order.

All classified advertising payable in advance.

DISPLAYED—PER INCH

Classified display advertising set in single or double column style:

1 inch	1 time	$7.00
1 inch	13 times	6.50
1 inch	26 times	6.00
1 inch	39 times	5.50
1 inch	52 times	5.00

Rates are governed by total space used within 12 months from date of first insertion. Credits are allowed when lower rates are earned.

FORMS CLOSE MONDAY NOON—PUBLISHED EACH THURSDAY

HELP WANTED

WANTED
ASPHALT TECHNOLOGIST

Position requires man with technical degree who has had five years' experience in the manufacture and blending of roofing and paving asphalts. Location, middle West with medium sized oil company. Our employees know of this advertisement. Box B-453, The Oil and Gas Journal, Tulsa, Okla.

WANTED—Graduate mechanical engineer who has had at least several years' experience in maintaining Diesel engines, also heavy centrifugal pumps. Permanent position not in war production; attractive salary. Please reply in writing stating education, age, draft status, experience, salary expected and references. Box B-445, The Oil and Gas Journal, Tulsa, Okla.

WANTED

HIGH CALIBER SALES AND DEVELOPMENT ENGINEER

The man we want must be experienced and have a sound knowledge of markets in the grating and welded steel products field. He must know production methods and be familiar with the patents situation. He must be capable of developing markets and be able to design and sell. Please state your qualifications in detail. Here is an unusual present and future opportunity for the right man with a long established, highly rated company. Write to—

GUY C. CORE CO.
Advertising Agency
Reynolds Bldg.
Jackson, Michigan

HELP WANTED

PROCESS ENGINEERS

Graduate Chemical Engineer or Chemist with several years experience in refinery or oil field on design and operation of light end equipment. Permanent position. Men employed in war industries will not be considered. Reply must state experience, education, age, draft status and salary expected. Box B-441, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Geological Engineer not subject to draft, experienced in Oklahoma and Kansas for well completions, scouting, sample, and subsurface work assisting district geologist independent oil company. Medium salary and expenses outside Tulsa. War manpower commission requests that applications from those now employed in war industries not be considered. Address Box B-465, The Oil and Gas Journal, Tulsa, Okla.

WANTED: Refinery Engineer who has had recent active contact with design or operation of modern refining processes, preferably plants for production of hundred octane aviation gasoline. Must be graduate engineer. An attractive connection in large organization is available for the right man. Write Drawer 2481 or telephone 2-3107, Tulsa, Okla.

EXCEPTIONAL opportunity for engineering writer familiar with drilling and producing operations. Work will enable person to keep abreast of latest developments in field and development practices. Previous experience in writing not required. Replies strictly confidential. Box B-461, The Oil and Gas Journal, Tulsa, Okla.

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

SITUATIONS WANTED

EXPERIENCED PRODUCTION MAN Wants interest in producing property; will look after all operations and reports. Age 41, have family, 22 years experience production, drilling, good education, references. Box B-392, The Oil and Gas Journal, Tulsa, Okla.

SITUATIONS WANTED

PETROLEUM Executive with record of accomplishment in administration of financial and managerial operations in South, Middle West, and East available for permanent connection any part of country. Rm. 1404-105 W. Madison, Chicago, Illinois.

REFINERY ENGINEER—Age 42, Classification 3A. Experienced, Design, Construction, Operation and Maintenance of modern equipment. Box B-430, The Oil and Gas Journal, Tulsa, Okla.

REFINERY Superintendent or Process Foreman, now employed. Desires position with aggressive firm with future opportunities. 13 years' experience in the petroleum refining industry, 4 years' experience in the power industry. Familiar with modern operation, maintenance and construction methods. Box B-452, The Oil and Gas Journal, Tulsa, Okla.

REFINERY Engineer age 40, seventeen years design, maintenance, and operation. Box B-466, The Oil and Gas Journal, Tulsa, Okla.

THOROUGHLY EXPERIENCED MARKETER AND OPERATIONS Manager will consider change. One company 20 years, both wholesale and retail experience. At present Manager of bulk plant doing about 4,000,000 gallons annually. Only reason for considering change is to better myself. Married, 2 children, 44 years old, Protestant, active civic worker, do not drink, pleasing personality, know right from wrong. Well qualified to lead organization by inspiring loyalty with hard work and fair play, so as to produce maximum results. Salary or commission, independent or major company connection desired. Prefer Southern or Midwestern section. Box B-463, The Oil and Gas Journal, Tulsa, Okla.

REFINERY CONCRETE FOUNDATIONS. Design and construction. Drawings prepared by Registered Civil Engineer. P.O. Box 209, Pasadena, California.

INDEPENDENT Leaseman, age 40, married, draft exempt, High School education; experienced leasing large blocks in southeast, desires position with company as leaseman or scout. Ability and character reference best. Answer Box B-462, The Oil and Gas Journal, Tulsa, Okla.

EXPERIENCED Landman with many years major company service desires connection with active organization. Familiar with purchase of leases, royalty and mineral rights, right-of-way, title work and claim adjustments, in several states. Good background of ten years with large independent operator in production and drilling department. Successful in selecting and handling personnel. Age 43, Excellent health, Family, Draft classification 3-A-4. Box B-460, The Oil and Gas Journal, Tulsa, Okla.

INCORPORATION

DELAWARE CHARTERS: Powers broad, taxes low. Many of the largest corporations have Delaware charters. Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

LEGAL BLANKS

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

ROYALTIES

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

BUSINESS OPPORTUNITIES

OPERATOR wants financial group to underwrite partial cost of drilling wells to offset production in Oklahoma. Box B-447, The Oil and Gas Journal, Tulsa, Okla.

FINANCING

CAPITAL SEEKERS—Interested in raising $25,000 or more for a legitimate project should write to AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

(Continued on Next Page)

CLASSFIIED ADVERTISING — EQUIPMENT FOR SALE

NEW GATE AND GLOBE VALVES ALL NEW—SPECIAL OFFERING

Must be sold in one lot

24—¾" Series 90 screwed, OS&Y Gate Valves.
24—¾" Series 90 screwed, OS&Y Globe Valves.
50—1" Series 90 flanged, OS&Y Globe Valves.
50—1" Series 90 flanged, OS&Y Gate Valves.
42—1½" Series 90 flanged, OS&Y Gate Valves.
32—2" Series 90 flanged, OS&Y Gate Valves.
61—3" Series 90 flanged, OS&Y Gate Valves.
33—4" Series 90 flanged, OS&Y Gate Valves.

All Standard Dimensions. Approximately $25,000.00 in repair parts furnished with the above valves. Total new value of valves alone $65,000.00.

Will Sacrifice. Wire, Phone or Write

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry — Robt. W. Duden
Union Ave. at 21st Street — Tulsa, Oklahoma

---

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.
Terms to suit.
CINCINNATI MACHINERY & SUPPLY CO.
26 West 2nd St., Cincinnati, Ohio.

FOR SALE: Compressor Units near Crane, Texas. 2—90 H.P. Clark tandem 2-stage gas engine compressors and 3—Vertical 100 H.P. Model T-137 Clark gas engines, direct connected to Vertical 2-stage Clark compressors. Cities Service Oil Company (Pennsylvania), Houston, Texas.

NEW power driven skid mounted piano wire winch, capacity 12,000 feet .072 line, 5 H.P. Briggs & Stratton Gasoline Engine (without measuring device). $332.00.—Box 5298, Dallas, Texas.

USED Admirality good condensor tubes. One 15 ton locomotive crane. 25—Standard gauge steel flat cars, 100,000# capacity each. Steel buildings—Water tanks on towers of all sizes. Write, wire or phone for INDUSTRIAL EQUIPMENT. INDUSTRIAL SUPPLY & EQUIPMENT CO., INC., 338 Baronne Street, New Orleans, La.

FOR SALE — A large stock of reconditioned valves and fittings suitable for refinery and pipe line service. Inquire Eason Oil Company, Enid, Okla.

---

1 USED Cooper Bessemer GMA 17" x 20" Power Cylinder with piston & rings, Standard size. Box B-454, The Oil and Gas Journal, Tulsa, Okla.

TO SELL—2000' to 2600' 4½" full-hole drill pipe, 30' lengths, Hughes Tool Joints—or—will exchange for 3½" full-hole drill pipe. Three 25 HP single cyl. gas engines. TO BUY—long drill collars. A. W. Adkisson, W. T. Waggoner Bldg., Fort Worth, Texas.

Second hand Oklahoma City alloyed sucker rods, ¾", ⅞" and 1".
Sucker Rods, Fishing Tools, Tubing Spiders, Tubing Catchers, all sizes.
Structural Steel and Reinforcing Rods.

M. R. TRAVIS
1702 S. Boulder Tulsa, Oklahoma.

DIESEL—GAS—ENGINES
Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.
Complete information on request.
A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE—Two 15x10 Chicago Pneumatic Compressors less motors or power units. In excellent condition, suitable for low pressure service. Inquire Eason Oil Company, Enid, Okla.

FOR SALE—Water pumping unit: 5" triplex Demming pump on steel skids with McCormick-Dearing engine with Texrope drive. Good condition. Write Newby, 2909 First Nat'l. Bldg., Oklahoma City, or phone 2-7277.

FOR SALE: Two 110-HP Miller gas driven twin cylinder compressors. Priced right. Inquire Eason Oil Co., Enid, Okla.

USED Cranes, Shovels, Draglines, Clamshells, Bulldozers, Scrapers, Pumps, Compressors, Graders, Gasoline and Electric Motors. L. A. ROUNTREE, 362 Pierce Street, Gary, Indiana.

2—10 D 6 Gaslin Type OCS used pumping units with XAH used 28 HP Waukesha motors. 1—14 C Jensen used pumping unit with XAH used 28 HP Waukesha motor. Fort Worth Pipe & Supply Co., Fort Worth, Texas. Phone 2-1204.

HORIZONTAL STEEL TANKS

6—10 Ft. dia. by 30 Ft. Long.
2—10 Ft. dia. by 29 Ft. 6 In. Long.
2—9 Ft. dia. by 30 Ft. Long.
10 Above Tanks in Western Kansas.

3—4,000 Gal., 2—6,500 Gal.
2—10,000 Gal. in Ohio and Pennsylvania.

VERTICAL TANKS

29,000 Bbl. 90'6" x 25'6"
19,600 Bbl. 75' x 25'5"
2—7,500 Bbl. 44' x 26'
5,500 Bbl. 37'6" x 27'6".

Located in the East.

1500 BBL. ATMOSPHERIC DISTILLATION REFINERY

700,000 Gal. Storage Cap., 1500 Bbl. Tube Still, 1500 Bbl. Fractionating Tower, 150 H.P. Boiler, Pumps, Compressors, Condensers, Heat Exchangers, Agitators, Loading Rack, etc.

R. C. STANHOPE, INC.

60 East 42nd St. New York, N. Y.

FOR SALE—One #6 Type D-1618 Marley Tapered Type Cooling Tower; capacity 600 GPM; priced right. Inquire Eason Oil Company, Enid, Okla.

5—7½"x20" Type VS, 500-lb. W. P. Clark Compressor Cylinders complete with clearance pockets. Call or write Cimarron Gasoline Corp., Box 246, Coyle, Okla.

COUPLINGS: For Sale — 2000 pcs. 5½" OD, 500 pcs. 7" OD, 100 pcs. 6⅝" OD. All 8 Round Thread, API Casg. New, Perfect, Mill Tested. JULIUS M. FOGELMAN, Reading, Penna.

COUPLINGS
2500—Brand new 13", OD casing couplings, 8-V thread, priced to sell. Louisiana Iron & Supply Company, Longview, Texas.

FOR SALE: O.C.S. Drilling Clutch, type F.C. V-Belt Drive, mounted on steel skids. Wire or write C. V. Phillips, 403 Crescent Blvd., Hutchinson, Kansas.

ONE RL Cardwell Double Drum Spudder. Mechanically A-1 shape. Complete with lines and tools. Address 2501 North Hudson, Oklahoma City, Oklahoma.

3—D8 Caterpillar Diesel tractors—12 yd. Scrapers—Bulldozers; 9 Kohler 1500 watt light plants; 1—5,000 watt Delco plant; 2—2500 watt Delco plants; 200 HP Fairbanks-Morse 175 KVA Light Plant 2300 volt; 100 HP Fairbanks-Morse 75 KVA 2300 volt. We buy Diesel Light Plants—Shovels—Draglines. Machinery Sales Company, 1718 Walnut, Kansas City, Mo.

FOR SALE—Two 10¾ in. Hughes 4000# test reconditioned valves in perfect shape. Also many other sizes. James W. Lomax, 812 Esperson Bldg., Houston, Texas.

1—4" Shell 4' x 40' Forged Steel Reaction Chamber
1—½" Shell 5' x 74'—4000 barrel cap.—Crude Oil Fractionator with Trays.
120—Pieces 3" I. D.—3½" O. D.—30' long—Chrome Tubes.
30—Pieces 3½" I. D.—4" O. D.—21' to 28' long—Chrome Tubes.
162—3½" O. D.—6½" Centers—Chrome Key Headers.
30—Pumps, various sizes and types.

A. C. BARTSCH
BOX 127, FOREST PARK, ILLINOIS

SPECIAL OFFER
IMMEDIATE SHIPMENT

OXYGEN-ACETYLENE WELDING HOSE SETS

Guaranteed—Heavy Duty
Standard Size—Double Braid
Samples furnished on request

Each set consists of OXYGEN hose (BLACK) and ACETYLENE hose (RED) with standard brass couplings attached to fit all makes of torches and gauges.

Length set	Price per set
12½ Ft. set	$ 3.10
25 Ft. set	5.60
50 Ft. set	10.60
75 Ft. set	15.60
100 Ft. set	20.60
Connector set	.30

Hose also furnished in continuous length reels of approximately 250 ft. and 500 ft. lengths.

OXYGEN HOSE	10c per ft.
ACETYLENE HOSE	10c per ft.
STANDARD COUPLINGS	15c each

Prices net—F.O.B. New York

CARLYLE RUBBER CO., Inc.
62 Park Place New York, N. Y.

Classified Advertising

EQUIPMENT FOR SALE

FOR SALE OR TRADE: Complete Cable Tool Drilling Rig with 85 H.P. Boiler, Ajax Steam Engine Complete Tools 6" to 12", also 96' Angle Iron Derrick, Mead, Kansas. John Irby, Box 4387, Oklahoma City, Okla.

FOR SALE: Four Gasoline Storage tanks, 10' x 20' Horizontal Welded steel. Capacity 10,000 gallons. Excellent condition. Located Kaw City, Okla. Two 1500 Bbl. Flat-Seam API Bolted Tanks now in use, Okla. City. John Irby, Box 4387, Oklahoma City, Okla.

FOR SALE: Portable Lincoln 300 Amp. Electric Welding Unit, Stutz motor, Mounted on good tires, all A-One condition. Price $575.00. General Tool & Supply Co., Box 4387, Oklahoma City, Okla.

FOR SALE: 70 HP OIL-FIELD-TYPE BOILER & boiler equipment. Steel office desks and files. Also, valves, galvanized and black iron pipe and fittings in sizes from ½ to 2 inches. Toledo & Howe scales. Box B-464, The Oil and Gas Journal, Tulsa, Okla.

For Sale- **RAIL OIL PLANT**

15—10,000 gal. tanks, some with coils

In the Heart of Chicago Industry

Most Suitable for Fuel Oils

FELOMAN PET. 544 W. Roosevelt HArrison 3500

EQUIPMENT WANTED

WANTED — Dynamometer. Suitable for use with Chevrolet Test Engine. Reply to Box B-446, The Oil and Gas Journal, Tulsa, Okla.

WANT TO BUY two or three second hand heavy field storage tanks with roofs from 10,000 to 80,000 bbl. capacity, either welded or riveted. Please state location of tanks and specifications together with price. Box B-450, The Oil and Gas Journal, Tulsa, Okla.

WANTED: 4000 pcs. each of 6" and 8" Dresser or Dayton Couplings. Can also use 6" and 8" colona line pipe thread protectors. JULIUS M. FOGELMAN, Reading, Pa.

WANT TO BUY: PA-100 h.p. International Engines. FOR SALE: 1000-barrel riveted tank, several 500-barrel riveted tanks. Address Box 896, Sapulpa, Oklahoma.

DIESELS suitable for pump and draw works service, 100 HP. Also 2000'—4½" quality drill pipe. Require full particulars and prices. Box 366, Ridgewood, N. J.

WANTED

Abandoned **Pipe Lines**, in or out of the ground, **Oil Wells**, **Steel Buildings** and Steel Storage **Tanks** of all sizes.

JOS. GREENSPON'S SON PIPE CORP.

National Stock Yards, St. Clair Co., Illinois.

EQUIPMENT WANTED

DIESEL ENGINES

Total 1600 HP. required, with or without Generators. Consider units 225 HP. and larger. Also smaller high speed units for standby service. Preference given units immediately available. Give complete details and price. Address Purchasing Department, Box B-423, The Oil and Gas Journal, Tulsa, Okla.

LARGE MINING company is desirous of purchasing one or two Askania Vertical magnetometers in good condition. Apply A. Brandt, 15 Grenadier Heights, Toronto, Canada.

LEASES AND DRILLING BLOCKS

LEASES ROYALTIES

PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois.

20 Years' Experience

Inquiries Invited

B. D. BUCKLEY

60 Broadview Drive, Clayton St. Louis, Mo.

NEW MEXICO
State Oil and Gas Leases

Forty acres and multiples thereof, in a new HoT spot. 23 oil companies own surrounding leases. Write for information. No obligation. HARRY S. WRIGHT, New Mexico State Lessee, Farmington, N. M.

CRANE COUNTY, TEX., land nearby Gulf's drilling Sec. 2, B-28. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Texas.

68 ACRES to lease for oil in S. E. Okla. County. Oil struck within ¾ mile. A. A. Ballentine, 407 Sierra Madre Ave., Baldwin Park, Cal.

5,000 A. West Texas. Good Geology for 5,000 ft. test. Small Bonus, 5 year leases; $0.25 rental. Drilling permit applied for. Operator needs some assistance. 600 Capps Bldg., Fort Worth, Texas.

HAVE WELL with oil filling casing within few feet of top. Want production test made and more wells drilled. Shallow drilling, good acreage. Box B-442, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 50 shallow producing wells in California. For attractive price, write owner, 649 So. Olive St., Room 1027, Los Angeles, Calif.

PATENT ATTORNEYS

PATENTS, Trade-Marks. Booklet, "General Information Concerning Inventions and Patents" and "Free Schedule" sent without obligation. Established 1915. Lancaster, Allwine & Rommel, Suite 418, Bowen Bldg., Washington, D. C.

Oil Demand at New Peak

(Continued from Page 77)

trends of 1942 will prevail in 1943. Some curtailment in output may result at plants which are not expanding facilities to manufacture those products required by the Army and Navy including the lend-lease needs of other nations.

Petroleum wax shipments in 1942 decreased from the record requirements of 1941. This was brought about largely through the restrictions in the war operations of domestic users.

Other Products

Production and consumption of petroleum coke was less in 1942 than in 1941. The strong demand and higher prices for residual fuel oils had a tendency over a large part of the year to increase the output of that product at the sacrifice of coke. The use of coke for metallurgical purposes by war industries brought about a change in this trend at several refineries which were directed to increase their production. Stocks of coke were exceptionally low at the close of 1942.

Some of the peacetime uses of petroleum asphalt were contracted last year but military demands largely offset this loss and consumption in 1942 was practically the same as in 1941. Most of this miltary demand came from camps, airports, naval stations and highways leading to new war production plants. Demand and output of road oils decreased in 1942.

Inventories

The petroleum industry brought 1942 to a close with the lowest inventories of that date in 18 years. The latest data of the Bureau of Mines show that stocks of oil on November 30, 1942, totaled 502,533,000 bbl. Weekly reports of the bureau and those of the American Petroleum Institute indicate that December brought stocks under 500 million barrels with a 58,000,000-bbl. reduction or 159,000 bbl. daily for the year.

The December 31 stocks were the lowest year-end inventory since 1924 when stocks of all oils on December 31 aggregated 492,099,000 bbl. Measured in days' supply in relation to the demand that materialized in 1925, the 1924 stocks represented 211 days' requirements. In comparison the inventories at the close of last year in relation to the minimum anticipated demand this year were approximately 110 days' supply.

The large reduction in gasoline stocks of about 12 million barrels, according to A.P.I. reports, came as a surprise to those who had anticipated that voluntary and enforced rationing would see tanks of refiners overflowing with excess gasoline.

The changes in stocks of fuel oil and distillate last year did not follow the usual seasonal pattern. This was particularly true in the case of residual fuel oils. Instead of increasing stocks on hand at refineries and bulk terminals during the summer season there was a slight downward trend for the entire country.

It is necessary to go back 2 decades to find stocks of crude oil as low as they were at the close of last year. Reductions up to November 30, according to Bureau of Mines reports, were 12,239,000 bbl. This total includes California heavy. Stocks of crude oil have not been as low at the start of a new year since 1921. Crude stocks increased in the early part of 1942 but a steady decline got under way in March and this trend continued throughout the remainder of the year.

Advertisers In This Issue

Alco Products Division of American Locomotive Company 29
Alcorn Combustion Co. 219
Allied Steel Products Corp. 194
Allis Company, Louis 40A-40B
Aluminum Company of America 23
Aluminum Ore Company 23
Amerada Petroleum Corp. 38
American Iron & Machine Works 123
American Machine and Metals, Inc., De Bothezat Ventilating Equipment Division 44
American Roller Bearing Co. 152
American Rolling Mill Co., The 82
Armstrong Machine Works 18
Anderson, James, Co. 200
Anderson-Prichard Oil Corp. 146
Atlas Supply Co. 163
Babcock & Wilcox Tube Company, The 116
Badger & Sons Co., E. B. 15
Baker Oil Tools, Inc. 50
Baroid Sales Division, National Lead Company 173
Brewster Company, The 226
Briggs Clarifier Co. 145
Briggs & Stratton Corp. 122
Brown & Brown, Inc. 200
Brown Instrument Company, The 41
Buda Co., The 231
Butler Manufacturing Co. 215
Cameron Iron Works, Inc. 102
Cardwell Mfg. Co., Inc. 2
Caterpillar Tractor Co. 165
Century Electric Company 17
Chain Belt Company 26
Chemical Construction Corp. 35
Chicago Bridge & Iron Company 154-155
Clark Brothers Company 143
Classified Advertising 237-238-239
Continental Motors Corp. 28
Continental National Bank of Fort Worth 210
Continental Oil Co. 46
Cooper-Bessemer Corp., The 190-191
Crane Packing Co. 39
Crutcher-Rolfs-Cummings 200
Curtin, W. H., & Co., The 150
Davis Regulator Mfg. Co., The 45
Dayton Dowd Co. 150
Dearborn Chemical Co. 124
De Bothezat Ventilating Equipment Division of American Machine and Metals, Inc. 44
Double Seal Piston Ring Co. 194
Dowell Incorporated 48
Durametallic Corp. 170
Edward Valve & Mfg. Co., Inc., The 105
Elastic Stop Nut Corp. 127
Electroweld Steel Corp. 22
Engineering Laboratories, Inc. 159
Erie Bolt & Nut Co. 138
Filtrol Corp. 127
First National Bank of Fort Worth, The 210
First National Bank & Trust Co. of Tulsa, The ..... Inside Back Cover
Fisher Governor Company 34
Flori Pipe Co., The 27
Floridin Company, Inc. 214
Fluid Packed Pump Co. 13
Fluor Corporation, Ltd., The 11
Fort Worth Clearing House Association 210
Fort Worth National Bank, The 210
Foster Wheeler Corp. 19
Four Wheel Drive Auto Co., The 10
Gardner-Denver Company 30
Gaso Pump & Burner Mfg. Co. 37
General American Transportation Corporation—Terminal Division 97
General Geophysical Co. 174
General Paint Corporation 212
Girdler Corporation, The 86
Globe Steel Tubes Co. 31
Goodrich Company, B. F., The 3
Gott, H. P., Mfg. Co. 231
Grancell, I. H. 226
Guiberson Corporation 47
Gulf States Utilities Co. 188
Hanlon-Waters, Inc. 194
Hill-Hubbell & Co. 212
Hughes Tool Co. ..... Back Cover
Hunt Tool Co. 192
Hycar Chemical Co. 136
Independent Exploration Company 202
Ingersoll-Rand Co. 8
International Harvester Co. 95
Jensen Brothers Manufacturing Co. 45
Jerguson Gage & Valve Co. 198
Jones Co., The S. M. 129
Jones & Laughlin Steel Corporation 20
Kargl Aerial Surveys 230
Kellogg, M. W., Company, The 21-93
Kennedy Valve Mfg. Co., The 135
Landis Machine Company, Inc. 7
Lane-Wells Company 119
Laughlin Co., The Thomas 98
Lincoln Electric Company, The 89
Link Belt Company 5
Lucey Export Corporation 33
Lufkin Rule Co. 197
Lummus Co., The 112A-112B
Lunkenheimer Co., The 25
MacClatchie Manufacturing Company 227
Marley Company, The 141
Marmon-Herrington Co., Inc. 24
Marsh, James P., Corp. 36
Master Rule Mfg. Co., Inc. 38
Merco Nordstrom Valve Co. ..... Inside Front Cover
Mid-Continent Engineering Co., Inc. 42
Midwest Piping & Supply Company, Inc., The 96
Mission Mfg. Co., The 108
National Airoil Burner Co. 194
National Bank of Tulsa 90
National Supply Co., The 132-133
Naylor Pipe Company 216
Oil Well Supply Co. 160
Otis Pressure Control, Inc. 168
Pacific Pump Works 111
Patterson-Ballagh Corporation 225
Peerless Pump Division of Food Machinery Corp. 227
Penberthy Injector Corp. 81
Petro-Chem Development Co. 196
Petroleum Rectifying Company 107
Pittsburgh Steel Company 99
Powell, Wm., Co., The 16
Preformed Wire Rope Div. of American Chain & Cable Co. 12
Pure Oil Co. 40
Reed Roller Bit Company 114
Republic National Bank of Dallas 213
Rockford Drilling Machine Division of Borg-Warner Company 47
Ross Heater & Mfg. Co. 140
Seismic Explorations, Inc. 130
Southern Mill & Manufacturing Co. 187
Spang Chalfant, Inc. 157
Spang & Company 126
Timken Roller Bearing Company 1
Timken Roller Bearing Company, Steel and Tube Division 32
Toledo Pipe Threading Machine Co. 135
Tretolite Company 14
Universal Atlas Cement Co. 43
Universal Oil Products Co. 85
Vinson Supply Co. 120
Vogt, Henry, Machine Co. 4
Wall-Colmonoy Corp. 45
Wagner Electric Corp. 9
Warren Petroleum Corporation 100
Watson-Stillman Co. 166
Webster Engineering Co. 146
Wheatley Brothers Pump & Valve Co. 201
Wheeling Machine Products Company 150
Wickwire Spencer Steel Company 6
Wilson Manufacturing Co., Inc. ..... Front Cover
Wilson Supply Co. 221
Wisconsin Motor Corporation 45
Worthington Pump & Machinery Corporation 91
Zink, John, Co. 198

CALENDAR

February

NATIONAL OIL SCOUTS AND LANDMEN'S ASSOCIATION, business session, Dallas, Tex., February 4, 1943.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, New York, February 15-18, 1943.

March

SOUTHERN SAFETY CONFERENCE, fifth annual meeting, Hotel Peabody, Memphis, Tenn., March 1-2.

April

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, annual meeting, Texas Hotel, Fort Worth, Tex., April 7-9.

AMERICAN PETROLEUM INSTITUTE, Division of Production, Eastern district, William Penn Hotel, Pittsburgh, Pa., April 8-9, 1943.

NATURAL GASOLINE ASSOCIATION OF AMERICA, twenty-second annual meeting, Baker Hotel, Dallas, Tex., April 14-16.

May

PETROLEUM INDUSTRY ELECTRICAL ASSOCIATION, annual meeting, Houston, Tex., May 5-6, 1943.